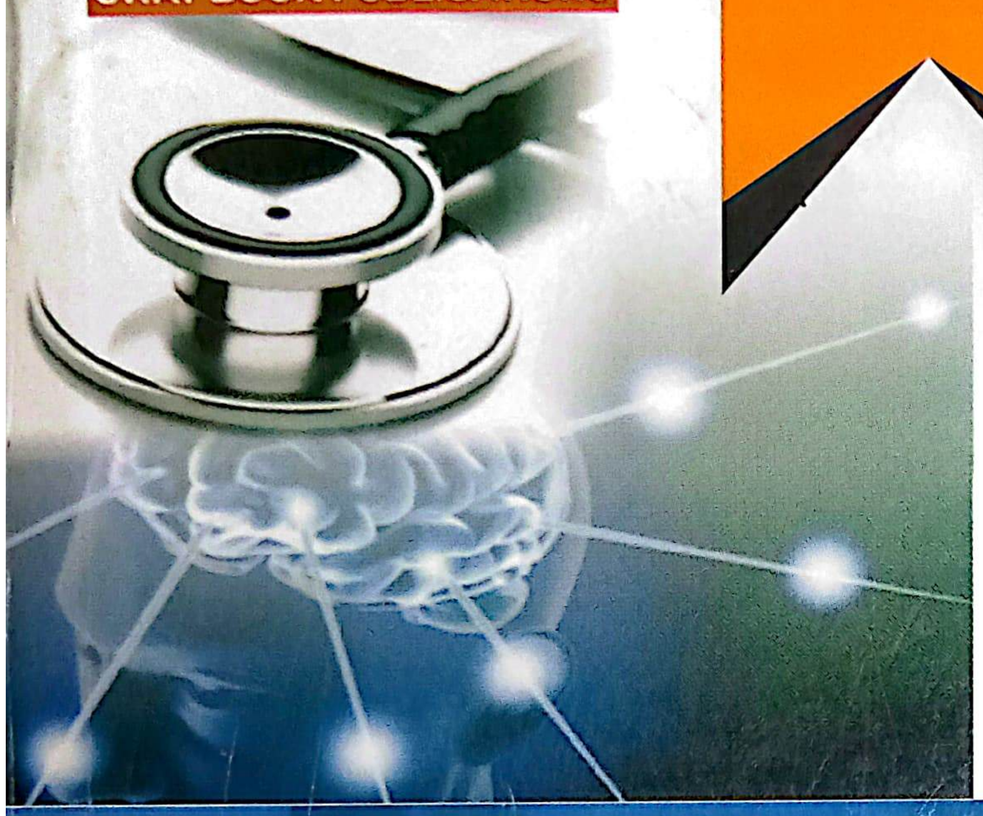
SWAT BOOK PUBLICATIONS



THE "RESIDENT PHYSICIAN"

Treatment Guide

The Book which Covers Needs of HOs,MOs,GPs, MCPS/FCPS/MD/MS Trainees & all Health Care Providers

- Histories with approach
- Medicine & Emergency Medicine
- Dermatology, ENT, Ophthalmology
- Surgery
- Paediatrics
- Gynaecology & Obstetrics
- Crash Cart Drugs

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HISTORIES WITH APPROACH

FEVER

O: Onset: P: Progression: Continuous, On, Off

D: Duration: **< 5 to 7days** – viral (if no red flag sign)

> 5 to 7days – exclude enteric fever & look for other causes

> Months – TB, Leukemia, Malaria etc.

D: Diagnosis: **Oral temp Am:** > 37.2 °C (>98.9 F°) **(low grade: <102 F°) (High grade:>104 F°)**

Pm: >37.7 °C (>99.9 F°) **(Medium grade:102 – 103 F°)**

C: Characteristics:

- **Continuous/Sustained fever:** causes: Lobar Pneumonia, infective endocarditis
- **Abstein or pel-ebstein fever:** causes: Hodgkin's lymphoma & other lymphoma
- **Neutropenic fever**: Fever + Neutrophilia = medical emergency
- **Intermittent fever:** pyogenic infection, Malaria
  Tertian fever; P. Vivax, P.Falciparum AND **Quartan fever;** P.Malariae
- **Undulant fever**: Brucellosis **Remittent fever:** Typhoid fever
- **Step ladder fever:** Typhoid fever. **Evening rise of fever:** Tuberculosis, lymphoma

A: Associated Symptoms:

- Fever + Dysuria + urgency + frequency: UTI (Urinary tract infection)
- Fever + Drowsiness + unconscious with/without convulsion: Meningitis, Encephalitis, cerebral malaria
- Fever + Sore throat: Tonsillitis, pharyngitis / Fever + vomiting + Diarrhea: Gastroenteritis
- Fever + headache + Malaise + runny nose + Dry cough: viral fever
- Fever + headache + Facial pain + Nasal congestion: Sinusitis
- Fever +chills & Rigor: Malaria, pneumonia, cholangitis, pyelonephritis, abscess.
- Fever + Headache + photophobia + vomiting + neck stiffness + Kerning`s Sign: Meningitis
- Fever + chest pain without breathlessness + cough: pneumonia
- Fever + jaundice: viral hepatitis, malaria, cholangitis, liver abscess, leptospira
- Fever (low grade)+ evening rise in temp + weight loss + decrease appetite: TB
- Fever + joint swelling + joint pain (arthritis): Viral arthritis, RA, SLE
- Bleeding manifestation (gum bleeding epistaxis): Dengue, leukemia, Aplastic anemia
- Fever + any discharge from ear: otitis media / Fever + coated tongue + Diarrhea: Typhoid
- Fever + cervical lymphadenopathy: TB, lymphoma, Leukemia, viral fever
- Fever+ Rash:

Infective:

Fever + Rash on 1st day: Varicella (Chicken pox) **Fever+ Rash within 1 day:** Rubella

Fever + Rash on 2nd day: Scarlet fever, dengue **Fever + Rash on 3rd day:** Pox (small pox)

Fever + Rash on 4th day: Measles, Rubella/German measles **Fever + Rash on 5th day:** Typhus

Fever + Rash on 6th day: Dengue **Fever + Rash on 7th day:** Enteric fever

Rash with fever: Meningococcemia, Ricketsial fever , Kawasaki

Rash after 48 days of fever: Chikungunya **Rash following fever:** Parvovirus B19 (slapped check)

Non-infective : CTD(SLE), Vasculitis, Adult still disease leukemia, aplastic anemia

FEVER/PYREXIA: Fever is an elevation of core body temp above the normal circadian range as a result of change in the thermoregulatory center, located in the anterior hypothalamus

- Normal range: Rectal temp > Oral temp > Axilla temp
- Range: Oral 37°C (98.7°F) with ± 0.4°C ± 0.7 °F
- Normal oral temp at Morning /Am 37.2 °C (98.9F°) AND Evening/Pm 37.7 °C (99 °F)

Chill: Sensation of cold, Sudden reset of thermostat to higher temp

- Body temp tend to rise by conserving heat by cutaneous vasoconstriction & involuntary contraction of skeletal muscles which are experienced as chills

Rigors: A profound chill with piloerection (goose flesh) accompanied by chattering of teeth severe shivering

Sweat: It is heat loss mechanism. When the set temp return normal a person feel hot become flushed and may begin to sweat

Fever of unknown origin (FUO): Temp > 38.3C° (101 °F) for more than 3 week with failure to diagnose (despite 1 week of inpatient investigation or several outpatient visit)

Causes

- Infectious (30% - 40%): Endocarditis, Tuberculosis & occult abscess
- Neoplastic (20% - 30%): Leukemia, lymphoma & Renal cell carcinoma
- Autoimmune (15% - 20%): Gaint cell arteritis, polymyalgia Rheumatica & JIA.

PATTERN OF FEVER:

- **Continuous /sustained fever:** Temperature elevation is persistent without touching base line. (Fluctuation does not exceed 1^0C) E.g. Lobar pneumonia, infective endocarditis
- **Intermittent fever:** The elevated temperature touches the baseline at least once in 24 hours, seen in pyogenic infections, malaria.
- **Remittent fever:** Here temperature falls each day, but not touching the base line (Fluctuation exceeds 2^0C) seen in lymphoma.
- **Relapsing fever:** Febrile episode are separated by intervals
- **Pel-Epstein fever:** Fever lasting 3 to 10 days followed by afebrile periods of 3 to 10 days. It is a feature of Hodgkin's and other lymphomas.
- **Tertian fever:** Fever occur in every 3rd day. (P.Vivax, P.Falciparum)
- **Quartan fever:** fever occurs in every 4th day (P.Malariae)
- **Quotidian fever:** A severe type of malaria where intervals b/w fever attacks vary from several hours to two days.
- **Evening rise of temperature:** Tuberculosis, lymphoma(with night sweats)
- **Step ladder type fever:** Fever rise one day, fall the subsequent morning and continuous to form peaks a troughs with insidious onset. See in typhoid fever.

Factitious fever: Falls elevation of temp seen in health professionals by taking thyroxin or by taking hot water before reading temp.

Drug fever: High fever, Relative bradycardia. Patient will not be toxic for the degree of fever seen in: Most of the drug sulfonamide penicillin, anti-convulsant medication.

Hyperpyrexia: Fever with an extreme elevation of body temp ≥ 41.5 C° (106.7°F).

- Such a high temp is considered a medical emergency.

Hyperthermia is an example of a high temp that is not a fever. It occurs from a number of causes, including heatstroke, NMS, malignant hyperthermia, stimulants such as amphetamines & cocaine, idiosyncratic drug reactions, & serotonin syndrome. Pontine hemorrhage, meningococcus meningitis, septicemia, cerebral malaria, thyroid strom

ANAEMIA

Anemia is a state in which the level of hemoglobin in the blood is below the normal range (Male: 13-18 g/dL, female: 11.5-16.5 g/dL) appropriate for age, sex and altitude

HISTORY

1. **Is there any H/O blood loss? If yes, is it acute or chronic?**
   - **GI bleeding:** Gum bleeding, hematemesis, melena. Bloody diarrhea, chronic hemorrhoid
   - **Respiratory:** Epistaxis, hemoptysis. **Genitourinary**: Menorrhagia, hematuria
   - **Skin:** Purpura, ecchymosis (if present following history should be taken: Non-itchy, painful or painless, palpable, size and shape)
2. **Is there any neurological for non-palpable, size and shape)**
   - Tingling, numbness and paresthesia (Sensory). Limb weakness (Motor)
   - Visual disturbance (Optic atrophy) (Cranial nerve). Loss of memory (Dementia) (CNS)
3. **Do you have fever?** TB, lymphoma leukemia.
4. **Do you have night sweat and weight loss?** TB, lymphoma
5. **Is there any bleeding manifestation and toxicity?** Acute leukemia
6. **Now try determine the underlying etiology of anemia:**
   - **Iron deficiency anemia:** Do you have
     - Abdominal pain and dyspepsia? **PUD (Peptic ulcer disease)**
     - Abdominal pain and alteration of bowel habit/ melena? **Carcinoma colon**
     - Abdominal pain and H/O use of steroid and NSAID? **Gastric erosion**
     - Abdominal pain and anorexia, vomiting, asthenia? **Carcinoma stomach**
     - Abdominal pain and bloody diarrhea? **Ulcerative colitis**
   - **Vitamin B12 deficiency:** Ask about
     - Are you a vegan?, H/O surgery abdominal surgery e.g gastrectomy, ileal surgery, IBD
     - Recurrent upper abdominal pain and diarrhea?[**Chronic pancreatitis**]
     - H/O prolonged use of PPI? H/O chronic diarrhea? [**Malabsorption**]
     - Any vitiligo/other autoimmune disease e.g. thyroid and DM? **[Pernicious anemia]**
   - **Congenital hemolytic anemia:** Ask about
     - Family H/O same kind of illness? Consanguinity of marriage of parents?
     - Recurrent anemia, jaundice and repeated blood transfusion
   - **Aplastic anemia:**
     - Past H/O jaundice or viral hepatitis?
     - Drug history: Cytotoxic, anti-convulsant, anti-thyroid, radiotherapy, benzene?
     - Occupational history: Farmer, dye industry, radiotherapy department?
   - **Anemia of chronic diseases:** Do you have
     - Anorexia, nausea, HTN, edema, DM? **[CKD] (Chronic kidney disease)**
     - Joint pain and rash? [**Connective tissue disease**]
     - Edema and breathlessness? **[HF] (Heart Failure)**

ON EXAMINATION:

1.FACE	❖ Hemolytic faces: Frontal and parietal bossing, depress nasal bridge, prominent zygoma ❖ Hepatic face, Malar rash & discoid rash: SLE ❖ Endocrine face: hypothyroid ❖ Puffy face: CKD. AND Vitiligo: B12
2.HAIR	❖ Alopecia in SLE and Malabsorption
3.EYES	❖ Anemia, & Jaundice: Hemolytic anemia, CLD ❖ Subconjunctival hemorrhage: Aplastic anemia, leukemia ❖ **Fundoscopy:** Hemorrhage, Roth spot: Aplastic anemia, leukemia, SLE
4.MOUTH	**Lip:** Angular stomatitis /chelilosis in B12 deficiency **Gum:** Gum bleed, hypertrophy: Leukemia, AML **Tongue**: Glossitis, smooth tongue in iron or B12 ↓ Loss of valate papillae in iron deficiency, **Raw brief tongue** in B12 deficiency **Oral cavity:** Pigmentation in Addison's disease **Buccal mucosa:** Petehiae in aplastic anemia & leukemia
5.NECK	❖ **Lymphadenopathy:** Leukemia and Lymphoma ❖ **Raised JVP:** Anemic heart failure ❖ **Goiter:** Hypothyroidism
6.CHEST	❖ **Boney tenderness:** Acute leukemia ❖ **Spider angioma, gynaecomastia**: Crhonic liver disease (CLD). ❖ **Apex beat shifted, flow murmur:** Heart failure
7.ARMS	❖ **HTN:** CKD. **↓BP, postural drop:** Addison's disease
8.HAND	❖ **Koilonychias:** Iron deficiency anemia , **Leuconychia:** CLD ❖ **Clubbing:** Malabsorption, Irratible bowel disease ❖ **Skin crease pallor:** Addison's disease ❖ **Swan neck or boutonniere deformity:** Rheumatoid arthritis
9.SKIN	**Purpura, ecchymosis Petehiae:** Leukemia, aplastic anemia **Pigmentation:** Addison's , thalassemia
10.ABDOMEN	❖ **Hepatosplenomegaly:** Leukemia, lymphoma, Kala-azar, CLD, hemolytic anemia ❖ **Ascites:** TB, leukemia, lymphoma, CLD, hemolytic anemia ❖ **No organomegaly**: Aplastic anemia, iron, B12 and folic acid deficiency
11.LEGS	❖ **Edema:** Crhonic kidney disease (CKD). ❖ **Leg ulcer;** Sickle cell anemia ❖ **Pain, touch, temperature, vibration, joint position sensation, Romberg sign positive, muscle power, jerk loss:** B12 deficiency

INVESTIGATION:

1) **CBC:** (Hb <13.5gm/dL in men, Hb < 11.5 gm/dL in female)
2) **Peripheral Smear:** (e.g microcytosis & hypochromia in Iron deficiency anemia)
3) **RBS, urine RE, ECG, CXR (PA view)**
4) **Serum creatinine:** (To rule out chronic renal failure - low erythropoietin)
5) **TSH:** (hypothyroidism or defects in pituitary hormone: will have mild anemia)

2nd line Investigation:

- **If MCV low (< 80 fL):** do serum ferritin (to rule out iron deficiency anemia)
- **If MCV low (< 80 fL) + Splenomegaly:** do Hemoglobin electrophoresis
- **If MCV high (> 100 fL):** Check B12, folic acid and TSH
- **Advice Bone marrow study:** Pancytopenia **or** If DDS is among any one of aplastic anemia, megaloblastic anemia, Leukemia, MM, undiagnosed or refractory anemia
- **In Endemic zone with of Kala-azar**: ICT for Kala azar

Third Line investigation:

1) **If IDA is suspected:** upper GI endoscopy, Colonoscopy, duodenal biopsy, Stool occult blood (3 samples)
2) **If CKD is suspected:** Serum electrolytes, serum calcium, phosphorus, serum uric acid
3) **If MM suspected:** Blood & urine protein electrophoresis, serum ca++, x-ray Skull
4) **If Kala azar suspected:** Splenic biopsy
5) **If RA is suspected:** RA factor, ESR, Anti-CCP
6) **If SLE is suspected**: ANA, anti-ds-DNA
7) **If CLL, AINA Suspected:** Direct Coombs test
8) **If lymphoma or CLL Suspected**: (serum lactate dehydrogenase) LDH
9) **If aplastic anemia or CLD Suspected:** HBS Ag & Anti-HCV
10) **If lymphoma or TB:** FNAC, or biopsy of lymph node

Labs in Suspected hemolytic anemia

1) **Reticulocyte Count:**
   Increase Retic count is criteria for hemolysis but not specific
   Seen in Blood loss, or bone marrow response to iron, vit B12 or folate deficiencies
   Normal or low count seen in patient with bone marrow suppression despite ongoing severe hemolysis
2) **Serum LDH:** Elevated in hemolysis
3) **Serum Haptoglobin:** low value is criteria for moderate to severe hemolysis
   Decrease is more likely in Intravascular hemolysis
4) **Indirect bilirubin:**
   Unconjugated (indirect) bilirubin is criterion for Hemolysis
   with hemolysis, the level of indirect bilirubin usually is < 4mg/dl
   Higher levels of indirect bilirubin indicate hepatic disorder or cholelithiasis, hemolysis

POLYARTHRITIS/ARTHRITIS

- O: Onset: **Sudden:** Mechanical, Gout **Insidious:** Inflammatory
- P: Pattern of joint involvement:
  - Lower Limb more than upper: Seronegative arthritis
  - PIP and MP joint involvement: Rheumatoid arthritis (RA)
  - DIP joint involvement: Psoriasis, gout, osteoarthritis
  - Back pain or spine involvement: Seronegative arthritis
  - Migratory: SLE, gonococcal arthritis
  - Symmetry of Joint involvement:

    (Symmetrical: RA, SLE, JIA) (Asymmetrical: Seronegative arthritis, Reactive arthritis)
  - Small or Large joint involvement

    Small joints: RA, SLE, generalized osteoarthritis, **Large joints:** Seronegative arthritis
  - Joint swelling: Present in All Arthritis and Absent SLE (Arthralgia)
- D: Duration: Acute: < 6 weeks; viral and **Chronic:** >6 weeks: Inflammatory
- C: Character of pain:
  - More on rest & in morning, relieved by activities; Inflammatory
  - More on activities and decrease at rest: Not inflammatory
- A: Age:
  - **<16 years:** JIA, Rheumatic fever and **20-40 years:** SLE, RA, Reactive arthritis
  - **Middle age**: Gout, RA and **Older age:** Osteoarthritis, pseudo gout
  - **Male:** Gout, Seronegative arthritis, A. spondylitis, Reactive arthritis
  - **Female;** RA, SLE
- M: Morning Stiffness:
  - Present on: Inflammatory arthritis e.g RA and absent non-inflammatory arthritis.
  - RA > 1 hour morning stiffness OA < 15 minutes morning Stiffness.
- A: Associated Symptoms:

1) Oral ulcer: SLE, Reactive arthritis, behcet's syndrome, enteropathic arthritis
2) Alopecia, photosensitivity, malar rash: SLE. Dry mouth, dry eye: Sjogren's syndrome
3) Change of color of finger on exposure to cold (Raynaud's phenomenon): SLE, Sclerosis
4) Skin lesion (Psoriasis), nail pitting and dystrophy: Psoriatic arthritis
5) H/O bloody diarrhea, sexual exposure/urethritis: Reactive arthritis
6) Eye changes (Red eye /painful eye): **Uveitis:** Seronegative spondyloarthritis.
   Conjunctivitis: Reactive arthritis and **Episcleritis, scleritis**: RA, vasculitis
7) Quotidian fever, Salmon Rash, Hepatosplenomegaly, adenopathy: Adult-onset Stills disease
8) Fever, migratory arthritis of large joint with Carditis Children (5-15 years): Acute RF
9) Weakness of proximal muscle, muscle pain: polymyositis
10) Recurrent spontaneous abortion: SLE with antiphospholipid syndrome

Seronegative Arthritis:

Psoriatic arthritis, Reactive arthritis, Ankylosis Spondylitis, Enteropathic arthropathy

Inflammatory Arthritis: Psoriatic arthritic, chronic infection (TB)

Investigation:

1) **CBC:** [(**Neutrophilia;** vasculitis, acute gout & sepsis) and (**Neutropenia;** Lupus)]
2) **ESR:** [(Normal; Lupus) and (Raised in all inflammatory arthritis)]
3) **CRP:** normal; Lupus & systemic Sclerosis 4) **Urine R/E:** Protein & RBC in SLE, vasculitis
5) **Serum Creatinine, SGPT** 6) **Synovial fluid Study**
7) **Autoantibodies;** RF, Anti-CCP, ANA, anti-dsDNA
8) **X-ray of joints**
   - Joint space narrowing; Focal: Osteoarthritis and Generalized: Inflammatory Arthritis
   - Joint Erosion-Non-proliferative or proliferative, marginal or central
   - New bone formation; osteophyte, enthesophyte & periosteal reaction

On general Examination:

1. Alopecia: SLE
2. Eye: Anemic: Anemia of chronic diseases, AHA, Red eye: Episcleritis, scleritis, conjunctivitis, uveitis
3. Oral ulcer. SLE, reactive arthritis: Crohn's disease
4. Rash:

Malar rash/Butterfly rash: SLE	Discoid rash: SLE	Livedo reticularis: SLE
Gottron's papules Dermatomyositis	Psoriatic rash	Heliotrope rash: Dermatomyositis

✓ Purpuric rash: Painful, tender vasculitis
5. Nail change: Pitting, onycholysis
6. Lymphadenopathy: SLE, RA, Still **7.** Planter fasciitis
8. Achilis tendenitis **9.** Circinate balanitis 10. Keratoderma blennorrhagica

Examination of hand:

Inspection:

1. **Deformity of finger**
   - 'Swan Neck' Deformity
   - Boutonnière Or 'Button Hole Deformity
   - Z Deformity of the thumb
   - Dorsal subluxation
   - Ulna deviation
2. **Dorsal guttering**
3. **Wasting of hand muscle**

Palpation and movement:

1. **Temperature:**
2. **Tenderness:**
Grade 1: Complains of pain
Grade II: Complains of pain & winces
Grade III: Winces & withdraws limb
Grade IV: Patient won't allow palpation
3. **Movement:** To assess the functional status Ask the patient to
a. Hold a glass
b. Open a button
C. To squeeze your fingers (To assess grip strength)
d. Prayer sign & Reverse prayer sign
e. Sublaxation of joint

Examination large joints:

1. Inspection:
a. Swelling **b.** Muscle wasting
c. Overlying skin change-red
d. Deformity of joint
2. Palpation:
- Tenderness: Joint line and periarticular
- Temperature & Swelling:
- Capsular or periarticular pattern
- Fluctuation: Positive if fluid, negative if soft tissue
- Movement: Active, passive
- Stress pain
- Stability of joint / Crepitus

BACK PAIN

O Onset:

- **Acute (Sudden);** Intervertebral disc prolapse / fracture (Look for neurological Sign)
- **Sub-acute (gradual);** suggest degenerative inflammatory, malignant or metabolic cause

P Progression:

Change in pain is i) same ii) better iii) worse (progressive): Malignancy, Ankylosis spondylitis

D Duration:

- When first start
- For how long have back pain

C Characteristic: Pain like

- **Dull /Ache:** Degenerative back pain
- **Sharp/shooting**: Inflammatory cause
- **Burning pain**: Nerve root compression
- **Pain in waves:** Renal or biliary Colic (stones)

R Radiation:

- Any radiation of back pain to other areas
- Back pain radiate to both leg causes are i) Cord compression ii) Cauda aquana Syndrome
- Back pain radiates to thigh & leg causes: i) sciatica

E Exacerbating factors:

- Pain increase or worse with
- Movement, Coughing, Sneezing, Straining: Disc prolapse /cord compression
- Increase with Walking, decrease with Rest => Spinal stenosis (Spinal Clauridation)

R Relieving factors:

- Is there anything which make pain better like
- Sitting / bending forward pain decrease: Spinal stenosis
- Not relieve by lying forward: Malignancy / infection
- Look for TB / Stap infection; both are most common cause of bone & joint infection
- Ask question related osteoporosis;
  - Family Hx; osteoporosis, psoriasis, A-spondylitis
  - Medication Hx: Steroid use
  - Past Hx of fracture
  - Early menopause
  - Thyrotoxicosis
  - Cigarette smoking

COUGH

O onset: From childhood => Asthma
Adult => GERD, Upper air way syndrome (PND) Post nasal drip, Respiratory tract infection

P Progression: Daily, intermittent, seasonal

D Duration:

Acute Cough: < 3 weeks $\xrightarrow{(causes)}$
- Acute RTI (respiratory tract infection).
- Exacerbation of COPD, Pneumonia, asthma
- Pulmonary embolism inhaled foreign body

Sub-acute: 3 – 8 weeks

Chronic: > 8 weeks $\xrightarrow{(causes)}$ Pulmonary tuberculosis (TB)

P Precipitating factors:
- Cough increase with food and drink or with posture : GERD (Gastro esophageal reflex disease)
- Worse on bending forward or lying flat.
- Cough ↑ with dust, pollen, fumes, animal, cigarette; Rhinitis, Extrinsic asthma
- Cough ↑ with Cold weather, exercise; symptom of asthma

C Characteristics: - **worse in morning;** chronic bronchitis.
- **Nocturnal cough;** GERD, asthma, left ventricular failure
- **Dry cough;** pharyngitis, asthma, atypical pneumonia, viral RTI (Respiratory tract infection)
- **Productive cough;** bronchiectasis, typical pneumonia
- **Episodic cough**; asthma and **Persistence cough;** pharyngitis

A Associated symptoms:

1) **Cough with Sputum:** (Productive cough) Ask about quantity and color, smell
2) **Cough with chest pain:**
   - **Pleuritic chest pain:** Acute infection, pulmonary embolism
   - **chest tightness;** Asthma, COPD
   - **central chest pain;** Left ventricular failure due to MI
   - **muscle skeletal pain;** Ribs fracture due to severe paroxysm of coughing
3) **Cough with Dyspnea:**
   - **Sudden dyspnea;** Asthma, pulmonary edema, pulmonary embolism.
   - **Subacute onset;** Pneumonia, aspiration, CODD, Asthma.
   - **Gradually progressive;** COPD, left ventricular failure.
   - **Orthopnea;** Paroxysmal nocturnal dyspnea, left ventricular failure.
   - **Wheezy;** Asthma, COPD, cardiac failure, Churg Strauss syndrome.
4) **Cough with Nasal Symptoms:**

- Allergic rhinitis
- Non allergic rhinitis
- Sinusitis
- Nasopharyngitis

$\Longrightarrow$ Post Nasal drip (PND) → *S*timulate Cough receptors in pharynx & larynx causing cough

- Sneezing
- Nasal Discharge

- Grey or clear: Chronic bronchitis
- Cough with profuse expectorant; Bronchiectasis, lung abscess.
- Rusty or brown, foul smelling; Bronchiectasis.
- Frothy, pink sputum: Left ventricular failure
- Dark color, foul smelling; Lung abscess.
- Typical pneumonia; **Salmon color sputum:** stap Aures, **Currant Jelly sputum:** klebsiella, **Rusty sputum:** pneumococcal pneumonia, **Green pigment sputum, foul smelling:** P. Aeruginosa

CYANOSIS

Definition: Bluish of Skin and mucosa resulting from an increased level of reduced Hb (Hb > 5g/dl) or due to abnormal Hb pigments in blood (Methemoglobin, sulfhemoglobin).

Note: Cyanosis cannot be detected by observation in patients with severe anemia (Hb <5 gm/dl)

A. Central cyanosis: (due to lung or heart failure)

It is seen in tongue and lips, it is due to desaturation of central arterial blood (in respiratory and cardiac failure and also due to right to left shunting)

Causes:

Cardiac causes:	**Respiratory causes:**
Left ventricular failure, Tetralogy of Fallot, Eisenmenger syndrome , veno-arterial shunt	Pneumothorax, COPD, Asthma Interstitial lung disease (ILD)

B. Peripheral cyanosis (due to peripheral vasoconstriction)

It is seen in hand and feet. A patient with central cyanosis will have peripheral cyanosis due to desaturation, but a patient with isolated peripheral cyanosis will have localized arterial lesion.

Causes: Cold exposure, Raynaud's phenomenon, peripheral arterial occlusion.

Acrocyanosis; Refer to bluish color in hands and feet and around the mouth (Circumoral cyanosis) the mucous membranes generally remain pink. Acrocyanosis is a form of peripheral cyanosis that usually reflects benign vasomotor changes in the affected extremities.

Polycythemia: Also cause cyanosis due to increase RBC mass and relatively increase deoxygenated Hb.

Raynaud pneumonia (RP): It is a type of Acrocyanosis that cause white, blue, and red discoloration of fingers and/or toes after exposure to change temperature (cold, or hot) or emotional events

Primary RP: Without any evidence of any associated disorders.

Secondary RP: Presence or associated disorder like SLE and Scleroderma.

Investigation:

1) ECG and ECHO rule out cardiac diseases.
2) CXR and pulmonary function test (PFT) to rule out lung disease.
3) Oxygen saturation (Spo2%) and ABG
4) Methemoglobin level; direct measurement of Methemoglobin should be performed in cyanotic patients with a normal paO2 in whom cardiac disease has been excluded.

APPROACH TO COMA (loss of consciousness "LOC")

❖ **Coma:** A deep Sleeplike state from which the patient can't be aroused.

Some important definitions

Drowsy: Inability to sustain wakefulness in the absence of any external stimulus.
Obtunded: Answers/respond to a painful stimulus.
Stupor: irresistible desire for sleep and the patient can't be aroused by vigorous stimuli.
Vegetative state: It signifies an awake but unresponsive state.
Locked in state: A state in which an awake patient has no means of producing speech or movement in order to indicate that he is awake.

❖ **Causes of coma:**

Metabolic	Drug overdose, anesthesia, Hypoglycemic coma, DKA, Hyperosmolar coma, Hyponatremia, Hypothermia, Hypothyroidism, Uremia, Hepatic failure, Respiratory failure (hypoxic brain injury)
Head injury	Cerebral contusion, Extradural hematoma, Subdural hematoma
Cerebrovascular accident	Sub Arachnoid hemorrhage (SAH), Intracerebral bleed, Brainstem infarction/hemorrhage, Cavernous sinus thromosis
CNS Infection	Cerebral malaria, Meningoencephalitis, Brain abscess, Sepsis, toxic enceph
other causes	Epilepsy, Brain tumor, Thiamine deficiency

DDS of Coma in diabetes (Hypoglycemia, DKA, HHS)

	Urine		**Blood**		
	Glucose	**Ketone**	**Glucose**	**Bicarbonate**	**Ketone**
DKA	+++	+++	High	Low (low pH)	++++
HHS coma	+++	Nil	Very high	Normal	Nil
Hypoglycemia	Nil	Nil or +	Low	Normal	Nil

Close DDS (Differential diagnosis)

Condition	**Vegetative state**	**Locked-in syndrome**	**Coma**	**Brain death**
Awareness	No	Yes	No	No
Sleep wake cycle	Yes	Yes	No	No
Response to stimuli	Yes/No	Only in eyes	No/Yes	No
Motor function	No purposeful movement	Vertical eye movements or eye blink preserved	No purposeful movement	None or only reflex spinal movement
Respiratory function	Normal	Normal	Variable	No

DDS of Coma in diabetes (Hypoglycemia, DKA, HHS)

	Urine		Blood		
	Glucose	Ketone	Glucose	Bicarbonate	Ketone
DKA	+++	+++	High	Low (low pH)	++++
HHS coma	+++	Nil	Very high	Normal	Nil
Hypoglycemia	Nil	Nil or +	Low	Normal	Nil

- AVPU Score
  - The AVPU score ("Alert, Voice, Pain, Unresponsive") is a scoring system by which a health care professional can record a patient's level of consciousness. It is a simplification of the Glasgow Coma Scale,
  - When compared to the GCS, the AVPU has been suggested to correspond in the following manner:
  - ✓ Alert (patient is awake) = 15 GCS
  - ✓ Voice Responsive (patient responds to verbal commands) = 12 GCS
  - ✓ Pain Responsive (patient responds to painful stimulus) = 8 GCS and Unconscious = 3 GCS

Coma Cocktail:

DONT (the Coma Cocktail) for immediate Treatment of an unconscious patient with no available history: "**Give DONT**"
D: Dextrose **O:** Oxygen **N:** Naloxone **T:** Thiamine
These (DON'T) will all quickly correct reversible causes of altered mental status

Physical signs of Coma by level

Signs	Diencephalon	Midbrain	Pons	M. oblongata
Level of consciousness	Drowsiness to obtundation	Light coma	Deep coma	Deep coma
Pupil reactivity & size	Small reactive pupils 2 –3 mm in diameter	Unreactive, dilated pupils (mid position)	Midposition pupils or pinpoint pupils	Unreactive pupils
Oculocephalic reflex	Eye moment & opposite direction of head turning	No eye movement, Maybe dysconjugate	No eye movement	No eye movement
Oculovestibular reflex	Eye moment towards irrigated ear	Abduction of ipsitateral eye or no eye movement	No eye movement	No eye movement
Respiratory pattern	Sighing or cheyne strokes respiration	Hyperventilation. Rarely cheyne stroke	Hyperventilation or apneustic breathing	Ataxic/cluster breathing

Pupil testing: Size (small = Miosis / large = Mydriasis)

- Shape: Equality (Anisocoria is a condition characterized by an unequal size of pupils.)
  Reaction to light: both pupils constrict when light is shown in either eye
- The ciliospinal reflex is useful for evaluating comatose patients. When the examiner pinches the neck, the ipsitateral pupil transiently dilates

DYSPNEA

Definition: Unpleasant subjective awareness of sensation of breathing

❖ O Onset:

A) **Abrupt:** (Few seconds to few minute)
- Inhalation of foreign body (usually children) and Pulmonary edema
- Pulmonary Embolism, Severe tension pneumothorax, Anaphylaxis,

B) **Acute:** (over one or two hours)
- Bronchial asthma (wheeze, allergy history, seasonal variation or diurnal variation)
- Left ventricular failure (Breathlessness exacerbated by lying flat, Hx of HTN, IHD)
- Pneumonia (fever, chest pain, Cough, shallow rapid respiration)
- Edema of larynx (allergic reaction)
- COPD (Lip pursing, crepitation's, apex beat not palpable, smoking Hx, chronic cough)
- Pulmonary edema (caused by toxins or inhalation, frothy sputum, crackles)
- Hysteria (Hyperventilation Syndrome)

C) **Sub-Acute** (Few days or few weeks)
- Left ventricular failure, Guillain-Barre Syndrome (GBS)
- Pleural effusion, Bronchogenic carcinoma, sarcoidosis, recurrent pulmonary embolism)
- Anemia, uremia (Hx of renal disease), Hyperthyroidism, acidosis (DKA)

D) **Chronic** (months or years)
- COPD & Pulmonary TB, Carcinoma, fibrosing alveolitis
- Obesity, anemia, renal failure, hyperthyroidism
- Chronic left ventricle dysfunction. And Pulmonary HTN (Primary or secondary)

❖ H History: H/O heart, renal, lung diseases, Hypertension (HTN), Smoking, seasonal allergy, DM

❖ A Aggravating & relieving factors:
- Improves on weekend/holidays: Occupational asthma, extrinsic allergic alveolitis
- Recurrent/Sleep: orthopnea / PND
- Breathlessness exacerbated by lying flat: Left ventricular failure
- Sudden chest pain exacerbated by movement: Tension pneumothorax

❖ A Associated symptoms:
- Pleuritic chest pain: pneumonia, pulmonary infarction, rib fracture, pneumothorax
- Central non-Pleuritic chest pain: MI, Massive Pulmonary embolism
- Cough or wheeze: Asthma, pulmonary embolism (PE), pneumothorax
- Respiratory distress+ raised JVP+ Tachycardia + Gallop rhythm + $B/_2$ basal crepitation: shifted apex beat: Left ventricular failure.
- Anemia (anemic heart failure) and Stridor's: obstruction of upper airway passage
- Wheeze, allergy history, seasonal Variation or diurnal Variation: Bronchial Asthma
- Lip Pursing, crepitation's, apex beat not palpable, smoking Hx, chronic cough: COPD
- Fever, Chest pain, Cough with sputum, shallow rapid respiration: Pneumonia
- Sudden Pleuritic chest pain or SOB, breath Sound absent: Tension pneumothorax
- Chest clear: Diabetic ketoacidosis (DKA), uremia, psychogenic
- Sever crushing, Retrosternal pain, dyspnea, Tachycardia, shock: Pulmonary embolism

- **Investigation:**
  1) ECG (Left Ventricular Failure due to MI), Trop I
  2) CXR (PA view): To look for pulmonary edema.
  3) RBS: Raised in DKA
  4) ECHO: In Patient having cardiac disease
  5) Serum creatinine: Raised in uremia (Chronic kidney disease)
  6) ABG: To rule out acidosis
  7) CBC: To look for anemia (anemic heart failure)
  8) Infection Screen: (infection aggravate cardiac failure)

Paroxysmal nocturnal dyspnea (PND)

Patient develop breathlessness after 2-4 hours after the onset of sleep

Orthopnea: Patient develop breathlessness immediately after lying down

Breathlessness (Approach)

Orthopnea & B/L basal crepitation → Yes → Left ventricular failure (LVF)

NO ⇓

Edema & raised JVP → YES → CCF (Congested cardiac failure)

NO ⇓

Recurrent attack with Wheeze and/or Ronchi → Yes → Bronchial asthma

NO ⇓

Sudden onset tracheal shift & Silent resonant hemithorax → YES → Pneumothorax

NO ⇓

Fever, Cough, Bronchial breath sound → YES → Pneumonia

NO ⇓

Severe anemia → YES → Dyspnea on exertion due to anemia

NO ⇓

Recent stress, anxiety with clear chest → YES → Conversion disorder or malignancy)

HEMOPTYSIS

Definition: Hemoptysis is the spitting of blood that originated in the lung or bronchial tubes.

Classified as non-massive or massive based on the volume of blood loss

Non massive if blood loss < 200 ml per day

"Life-threatening hemoptysis" (formerly massive hemoptysis, by some authors) is defined as, when hemoptysis results in a life-threatening event including significant airway obstruction, significant abnormal gas exchange, or hemodynamic instability.

Hemoptysis can be life-threatening when there has been approximately 150 mL of blood expectorated in a 24-hour period (easily quantifiable by patients as roughly a half cup blood in 24 hours) or bleeding at a rate ≥100ml/hours

Causes (Remember "BATTLE CAMP"

- **B**ronchitis, **B**ronchiectasis, **A**spergilloma (Fungal infection of lung)
- **T**umor(lung malignancy), **T**rauma, **T**uberculosis, **L**ung abscess
- **E**mbolism(pulmonary embolism), **C**oagulopathy(bleeding disorders, Medications)
- **A**utoimmune diseases (good pasture syndrome), AV malformation, Alveolar hemorrhage
- **M**itral stenosis, **P**neumonias-Necrotizing pneumonia (Klebsiella, staphylococcus, legionella

Historical finding that suggest etiology of Hemoptysis:

- **Anticoagulant use:** Coagulopathy , **Smoking:** Bronchitis, COPD, neoplasia
- **Cough:** Bronchiectasis, COPD, foreign body, pneumonia, tuberculosis (TB)
- **Fever:** Bronchitis, lung abscess, neoplasm, pneumonia, pulmonary embolism, TB
- **Herat disease (Valvular or congestive heart failure):** Congestive heart failure
- **Immunocompromised:** Bronchitis, lung abscess, pneumonia, tuberculosis
- **Recent surgery or Immobilization:** Pulmonary embolism (PE)
- **Sputum production:** Bronchiectasis, COPD pneumonia, tuberculosis
- **Trauma:** Airway trauma, PE and Weight loss; COPD, neoplasia, tuberculosis
- **Weight loss:** COPD, Neoplasia, Tuberculosis

APPROACH

Fever, cough weight lose ⟹ yes **Suspect Tuberculosis**

↓ No

Smoker with clubbing weight lose ⟹ yes **Suspect bronchial carcinoma**

↓ No

Sudden sever dyspnea with pink frothy sputum ⟹ yes **Acute pulmonary edema**

↓ No

Thick copious purulent sputum ⟹ yes **Suppurative lung disease**

↓ No

Purpura, bleeding from other sites ⟹ yes **Suspect hemorrhagic disorders**

↓ No

Sudden chest pain with pleural rub ⟹ yes **Suspect pulmonary infarction**

JAUIDANCE

Definition: Jaundice is a yellowish discoloration of the skin, sclera (the white part of the eye) and mucous membranes caused by hyperbilirubinemia.

- Jaundice becomes visible when bilirubin level is > 3mg/dL (51 micromole/L)
- **Clinical jaundice:** Serum bilirubin > 3mg/dl **Latent jaundice**: Serum bilirubin 1 to 3 mg /dl

Classification of Jaundice (based on lab types):

Unconjugated hyperbilirubinemia

- Increase production., Decrease hepatic uptake, Decrease Conjugation

Conjugated hyperbilirubinemia

- Dysfunction of liver cells, Slowing of bile flow from liver (intrahepatic cholestasis)
- Obstruction of extra-hepatic bile flow (extra-hepatic cholestasis)

Hemolytic jaundice – Causes:

Intra Erythrocytic Hemolysis	Extra Erythrocytic Hemolysis
***Hereditary* RBC Membrane defects** Spherocytosis, Elliptocytosis **Hemoglobinopathies** Sickle cell disease, Thalassemia **Enzyme defects** – G6PD, deficiency, Pyruvate Kinase deficiency **Acquired** - B12, Folate deficiency, Paroxysmal Nocturnal Hemolysis	**Infections** – Malaria toxoplasmosis, IMN), hepatitis, atypical pneumonia (Mycoplasma) **Hypersplenism, Hepatic and renal disease, Physical agents:** Burns, cold exposure Traumatic: Prosthetic heart valves, March Hemoglobinuria, **DIC, graft rejection, Chemicals:** Drugs, venoms **Autoimmune** Collagen vascular disease, Autoimmune hemolytic Anemia **Malignancies:** Particularly hematologic neoplasia **Transfusion** of incompatible Blood, **Cold hemagglutinin disease , TTP, HUS, Hemolytic disease of the newborn,**

Predominantly unconjugated (indirect)	Predominantly conjugated(direct)
Increase bilirubin production Hemolysis, Ineffective erythropoiesis (B12, Folate deficiency), Tissue infarction, Blood collections	**Intrahepatic (inside liver)- Hepatocellular jaundice** Rotor syndrome, Dubin-Johnson syndrome, Recurrent benign intrahepatic cholestasis, Hepatocellular disease - Hepatitis Drug induced Cholestasis, Cholestatic jaundice of pregnancy
Decreased uptake of bilirubin by liver Shock, Infection, Sepsis Drug-Rifampicin **Decreased conjugation in liver –** Hepatitis Gilbert's, Crigler-Najjar, Neonatal Jaundice	**Extra Hepatic (outside liver) -Obstructive jaundice** Stricture, Stone, Tumors of bile duct Periampullary carcinoma, Lymph nodes Carcinoma of head of pancreas

Classification - Based on pathology:

- Hemolytic (Prehepatic) jaundice: accelerated breakdown of red blood cells, leading to ↑ in production of bilirubin.
- Hepatocellular (Hepatic) jaundice: is due to significant damage to liver function → hepatic cell death and necrosis occur impaired bilirubin transport across hepatocytes

Cholestatic: Jaundice or obstructive (Post hepatic) jaundice, Liver is normal but transportation of bilirubin is defective

Clinical features	Hemolytic jaundice	Hepatocellular jaundice	Obstructive jaundice
Icterus- Colour	Lemon Yellow	Orange Yellow	Greenish yellow
Itching	No	May / May not	Present
Bleeding tendency	-	+(Early)	+ (Late)
Bradycardia	-	-	+
Anemia	+	+ / -	+/-
Splenomegaly	+	+ / -	+/-

SYNCOPE

Definition: Transient loss of consciousness (LOC) results most commonly from reduced Perfusion of brain associated with loss of postural tone (Hypotension), recovery is immediate and no post LOC confusion (delayed recovery and post LOC confusion is classically Seen in generalized Seizures)

- **Presyncope;** If a person does not completely loss consciousness and muscle strength it is referred as presyncope

Non cardiac Syncope:

- **Vasovagal syncope**-Excessive vagal stimulation leads to bradycardia & hypotension (causes Severe pain or fear)
- **Orthostatic syncope**- due to postural drop of BP (Common causes prolonged standing, hypovolemia, diabetic autonomic neuropathy) Recommended acute treatment of vasovagal and orthostatic (postural hypotension)
- **Carotid sinus hypersensitivity-syncope** occurs after movement of neck, shaving or massaging over neck
- **Post micturition syncope**-Syncope occurs after micturition
- **Post tussive syncope** (Severe cough) Cough ↑ intrathoracic pressure that in turn ↓ venous return to heart
- **Vertebro-basilar arterial disease:** Arterial disease in the upper spinal cord, or lower brain, causes syncope if there is a reduction in blood supply, which may occur with extending the neck or after episodes of lower BP
- **The term "convulsive syncope"** Accompanied by tonic or myoclonic activity.
- **Vago-glossopharyngeal neuralgia** is characterized by paroxysms of sharp pain in the distribution of glossopharyngeal nerve. Rarely the condition is associated with arrhythmia and cardiac syncope
- **Subclavian steal syndrome** Arises from retrograde (reversed) flow of blood in the vertebral artery or the internal thoracic artery, due to a proximal stenosis (narrowing) and/or occlusion of the Subclavian artery.

Orthostatic hypotension: A drop of 20 mm Hg in the systolic blood pressure within 2 to 5 minutes of standing is a sign of orthostatic hypotension. Another indication is: A drop of 10 mm Hg in the diastolic BP within 2-5 minutes of standing

Carotid sinus hypersensitivity: Asystole for at least 3 seconds and/or a drop in systolic blood pressure of at least 50 mm Hg during carotid sinus massage.

Cardiac syncope: Aortic stenosis or HOMC, Severe MI, Atrial myxomas

- **Arrhythmia and heart blocks**-The most common cause of cardiac syncope is cardiac arrhythmia (abnormal heart rhythm) bradycardia, tachycardia, or too irregularly to pump enough blood to the brain.
- **Sick sinus syndrome**, a sinus node dysfunction, causing alternating bradycardia and tachycardia. Often there is a long pause (asystole) between heartbeat may occur with LOC
- **Stokes-Adams syndrome-syncope** produced due to cardiac arrhythmia (this is the one condition patient can develop syncope even on supine posture)

Causes/DDs of syncope "HEAD HEART VESSELS": **H;** Hypoxia/Hypoglycemia. **E;** Epilepsy-Convulsive syncope. **A;** Anxiety-psychiatric illnesses **D;** Disorders of brainstem Vertebro basilar arterial disease, **H;** Heart attack (MI). **E;** Embolism (Pulmonary). **A;** Aortic stenosis. **R;** Rhythm abnormalities (heart block, AF). **T;** Tachycardia (SVT, MAT) **V**; Vasovagal. **E;** Electrolytes (Hyponatremia). **S;** Situational (cough, Micturition), **S;** Subclavian steel syndrome. **E**; ENT - Glossopharyngeal neuralgia, **L;** Low systemic vascular resistance Orthostatic syncope **S**; sensitivity carotid sinus

Investigations:

1) **Blood sugar levels:** to rule out hypoglycemia. **ECG and treadmill (TMT):** To rule out Rhythm disturbances
2) **Carotid sinus massage** in patients >40 years old: in suspected cases of carotid sinus hypersensitivity
3) **Echocardiogram** 4) **Orthostatic challenge** (lying to standing orthostatic test or head-up tilt testing) when syncope is related to the standing position or there is suspicion of a reflex mechanism.
5) **24 hour Holter monitoring**; to rule out sudden arrhythmias.
6) **Orthostatic challenge - Headup Tilt Test:** When syncope is related to the standing position or there is suspicion of a reflex mechanism. **7) EEG:** To exclude fits

VERTIGO

O: Onset:

Acute or sudden vertigo: Peripheral vertigo

- Vestibular neuronitis, Otosclerosis
- Labyrinthitis, Multiple sclerosis
- Skull fracture, Meniere's disease
- CVD involving brainstem or cerebellum

Chronic: Central vertigo

- Vascular insufficiency of brainstem or basilar artery insufficiency supplying cerebellum
- Migraine
- Multiple sclerosis (MS)

P: Progression:

➢ **Recurrent:** Labyrinthine vertigo, **Persistent:** Central vertigo **Progressively increasing:**

D: Duration & frequency:

❖ **Recurrent vertigo lasting less than a minute:**

➢ Benign paroxysmal positional vertigo (BPPV), Post-traumatic vertigo, Psychogenic

❖ **Recurrent vertigo lasting for minutes to hours:**

➢ Migraine, Vertebrobasilar insufficiency, Meniere's disease

❖ **Spontaneous attack of prolong vertigo for a day or more:**

➢ Labyrinthitis, Multiple sclerosis, Brainstem infarction

A: Associated symptoms:

Hearing loss, tinnitus, headache, nausea, vomiting, pallor, sweating, double vision, frequent fall, ataxia, focal weakness, Confusion or loss of taste sensation

➢ Vertigo with slowly progressive unilateral hearing loss, tinnitus, dizziness and disequilibrium: Acoustic neuroma.
➢ Intermittent brief vertigo with occasional drop attack, ataxia, visual loss, double vision and Confusion: Vertebrobasilar insufficiency.
➢ Episodic, recurrent vertigo with auditory symptoms, headache, photophobia, aura: Migraine
➢ Vertigo with facial weakness and loss of taste sensation: Ramsay Hunt syndrome.
➢ Triad of episodic vertigo, tinnitus and progressive deafness: Meniere's disease.
➢ Vertigo with bilateral progressive hearing loss, tinnitus & paracusis willis: Otosclerosis
➢ Vertigo associated with agoraphobia: Psychogenic.

P: Past HX : Any head injury or trauma to the head, **Drug:** Aminoglycoside , anticonvulsant

P: Precipitation: Vertigo precipitated by movement of the head in a specific direction.

Does it relate to change in head posture such as rolling over bed or getting into or out of bed.

Peripheral Causes	Central Causes	Mixed (central + Peripheral) causes
• Vestibular neuritis /Labyrinthitis • Meniere disease • Benign paroxysmal Positioning Vertigo • Ethanol intoxication • Inner ear barotraumas • Semicircular canal dehiscence	• Seizures • multiple sclerosis • Wernicke encephalopathy • Chiari malformation • Cerebellar ataxia	• Migraine headache, Stroke & (PICA, AICA Strokes) • Vestibular artery insufficiency • Vasculitides, Cogan & susac syndrome • Granulomatosis with polyangiitis • Cerebellopontine angle tumor, meningioma • hyper viscosity Syndrome • Hypothyroidism, Pend red syndrome

VOMITING

O: Onset:

Acute: Gastroenteritis, Peptic ulcer disease (PUD), hepatitis, acute abdomen
Chronic: Chronic kidney disease (CKD), Intracranial space occupying lesions, Addison's diseases, Gastric outlet obstruction

C: Color:

Coffee ground: Bleeding in stomach
Bile Stained (greenish): Obstruction distal to pylorus

Content:

- Food taken on previous day (not stained with bile)- pyloric stenosis
- Bile stained - obstruction distal to the pylorus
- Fecal vomiting- Distal small bowel obstruction, colonic obstruction
- Gastro colic fistula

A: Associated Symptoms:

1) Abdominal pain - Mild to moderate: Peptic ulcer disease (PUD), Viral hepatitis
2) Severe: - Acute abdomen, Renal or biliary Colic
3) Diarrhea: Gastroenteritis
4) Constipation: Intestinal obstruction and Fever: Infective illness
5) Unilateral headache: Migraine, cluster headache
6) Morning headache more on straining & bending: Intracranial space occupying lesions
7) Chest pain: MI and Anorexia jaundice: viral hepatitis
8) weight loss: Addison diseases, Gastric outlet obstruction
9) Prolong Hx of vomiting with little or no weight loss: psychogenic

D: Drug Hx:

➢ NSAIDs, Opioids, Anti-malarial, chemotherapy, radio therapy, steroids. Digoxin

Note: if female ask about Last menstrual period "LMP" to exclude pregnancy

- ❖ Vomitus containing blood with Epigastric pain, H/O PUD or NSAID ingestion = Suspect bleeding peptic ulcer disease (PUD) or erosive gastritis
- ❖ Diarrhea and fever = Acute gastroenteritis
- ❖ Many cases following a meal = Food poisoning
- ❖ Constipation and abdominal pain = Intestinal obstruction
- ❖ Jaundice and tender hepatomegaly = Acute viral hepatitis
- ❖ Amenorrhea for 3-4 Months = Hyperemesis gravidarum
- ❖ No nausea, more on bending and straining = Suspect ICSOL

CARDIOLOGY

HEART SCORE

Definition: A clinical decision rule aimed at the identification of risk in the undifferentiated chest pain, is potentially quite useful as an adjunct to physician medical decision-making & identify patients at low, intermediate, high risk for short-term adverse outcome resulting from Acute coronary syndrome (ACS).

Consist of: History, ECG, Age, Risk factors & Troponin

CHEST PAIN CAUSES:

CARDIAC CAUSES	Myocardial ischemia (angina), MI, Myocarditis, Pericarditis, Mitral Value prolapse (MVP), Aortic stenosis, Aortic dissection, Aortic aneurysm

NON-CARDIAC CAUSES:

Emotional	Anxiety, fear, stress
Gastric causes	GERD, Esophagitis and spasm, Mallory-Weiss syndrome
Pulmonary	Pulmonary embolism, Pulmonary infarct, Pleuritis, Pneumonia, Pneumothorax, Malignancy
Musculoskeletal	Costochondritis, Rib fracture, Rib injury, intercostal muscle injury
Neurological	Prolapsed intervertebral disc, Herpes zoster, Thoracic outlet syndrome, intercostal neuralgia (especially in diabetic)

Non-Ischemic pain:

- Pleuritic pain, Location Mid or lower abdomen, Discomfort localize finger
- Constant pain lasting for days, Fleeting pains lasting for a few seconds or less and
- Pain radiating into the lower extremities.

History (Anamnesis)	Highly suspicious (Specific history for ACS)	2	
	Moderately suspicious (Mixed historic; ACS & non-ACS)	1	
	Slightly suspicious (Nonspecific history for ACS)	0	
ECG	Significant ST-deviation	2	
	Non-specific repolarization disturbance / LBBB / PM	1	
	Normal	0	
Age	≥ 65 years	2	
	45-65 years	1	
	≤ 45 years	0	
Risk factors	≥ 3 risk factors or history of atherosclerotic disease	2	
	1 or 2 risk factor	1	
	Non risk factors known	0	
Troponin	Elevated: > 3 time normal limit	2	
	Elevated: 1-3 time normal limit	1	
	≤ normal limit	0	
		Total	

Total Heart Score: Risk category & recommended management strategy.

- **0-3: low risk:** potential candidate foe early discharge
- **4-6: moderate risk**: potential candidate for observation & future evaluation.
- **7-10: high risk:** candidate for urgent or emergent intervention

SYSTEMIC HYPERTENSION (High blood pressure)

BLOOD PRESSURE Category	SYSTOLIC mmHg (upper number)		DIASTOLIC mmHg (lower number)	TREATMENT
NORMAL BP	Less than 120	and	Less than 80	Follow-up every year
ELEVATED	120---129	and	Less than 80	Life style modification, follow up in 6 months
HYPERTENSION (HTN)				
Hypertension Stage 1	130---139	or	80----89	No comorbidities: life style modification & follow up in 3 months Co-morbidities: start medication, follow up in 1 month
Hypertension Stage 2	140 or higher	or	90 or higher	Medication, life style modification
Hypertensive Crisis	Higher than 140	&/or	Higher than 120	

Diagnosis of HTN:

- If BP > 140/90 mmHg then conform it on ABPM (Ambulatory BP Monitoring) or HBPM (home BP Monitoring) if average BP > 150/95 mmHg start treatment
- If BP > 180/110 mmHg – start treatment

AMBULATORY BP MONITRING (ABPM):

- AT least 2 measurement per hour during the person usually awake hours(8am, 10am)
- Use the average of Atleast 14 measurement
- If ABPM is not tolerated or decline; home BP monitoring should be offered

Home BP Monitoring:

- BP measurement at home twice daily on both hand for Atleast 4days (ideally: 7 days)

TARGET BP:

- **Age less than 80** <140/90mmHg
- **Age > 80 or Without DM, CKD:** <150/90mmHg
- **With DM or CKD:** <130/90mmHg

Basic Investigations	Investigation of selected Patients
• RBS, Serum Creatinine • Serum electrolyte • Serum calcium, ECG • Fasting lipid profile • Free T4 TSH • CBC to rule out Polycythemia • Serum uric acid • Urine routine examination (Protein)	• X-ray Chest: to detect cardiomegaly, PE, Coarctation of aorta • Ambulatory BP recording: to assess White coat hypertension • Echo: to detect left ventricular hypertrophy • Ultrasound abdomen: to detect renal parenchymal disease • Renal Doppler/Renal angiography: to detect renal artery Stenosis • Plasma renin activity and aldosterone: to detect primary aldosteronism • Urinary catecholamine's: to detect Pheochromocytoma • Urinary cortisol & dexamethasone suppression test: to detect Cushing's syndrome

Management: -

1) Life style Modification

Modification	Recommendation	Systolic BP Reduction
Weight Reduction	Maintain normal body weight (BMI 18.5-24.9)	5-20mmHg/10kg weight loss
DASH diet: Dietary Approach to stop HTN	Diet rich in Fruit, Vegetable, and low-fat dairy products with a low content of saturated fat & total fat	8 – 14 mmHg
Alcohol	Stop Alcohol intake or decrease,2 drinks'/day	
Exercise	Regular aerobic exercise such as brisk walking (at least 30 min/day) Most days of the week	4 – 9 mmHg
Dietary Salt	Reduce dietary salt (< 6g/day ideally 3g/day)	2-8 mmHg
Smoking	Stop smoking	
Caffeine	Decrease caffeine intake	

2) Anti-Hypertensive Drugs: (A C D B)

A; Angiotensin converting enzymes inhibitors, Angiotensin receptor blocker
C; Calcium channel blockers, **D**; Diuretics, **B**; β-blockers,

- STEP 1:

IF AGE < 55years; start ACEI or ARB
ACEI => Enalapril 20mg, **Lisinopril** 10mg or 40mg, **Ramipril** 5mg or 10mg
ARBS=> Tab Losartan (Losanta) 25mg or 50mg OD
[Valsartan 40mg or 160mg, Irbesartan 150mg or 300mg, Olmesartan 20mg or 40mg]
IF AGE >55years; Start calcium channel blocker (CCB)
Tab Amlodipine (Sofvas) 5mg,10mg OD
[Nifedipine 30mg or 90mg, Verapamil 240mg , Diltiazem: 200mg or 300mg]

- STEP 2:

If desire or target not achieved with ACEI or ARB then add CCB **(A+C)**
Tab Amlodipine + Valsartan 5/80, 5/160, 10/160 (Extor, Avsar) OD Or
Tab Amlodipine + Olmesartan 5/20, 5/40 () OD

- STEP 3

If target BP not achieved with A + C then Add Diuretics (A+C+D)
(Diuretics: Chlorthalidone & indapamide Hydrochlorothiazide)
Tab Amlodipine + Valsartan + Hydrochlorothiazide (Co-Extor, AVSAR plus)
10mg + 160mg + 12.5mg OD

- STEP4:

If target BP not achieved with A + C + D then we called resistance HTN for the treatment add another diuretic if tolerated & not contraindicated

- If K+ < 4.5 then add Spironolactone 25mg – OD
- If K+ > 4.5 then add high dose thiazide like diuretics
- If further diuretic non tolerated or contraindicated or ineffective then consider alpha blocker or beta blocker

Note: Adding 2nd drug is more effective than increase dose of first drug

ANTI-HYPERTENSIVE MEDICATION:

ACEIs:

Action	They are powerful arteriolar and venous dilators
Drugs	Captopril 6.25-50 mg TDS, Enalapril 2.5-10 mg OD Ramipril 1.25-5 mg OD. Lisinopril 5 -20 OD, 20-40 mg/day as a single dose Perindopril - Start 4 mg once daily usual range: 4-8 mg/day (in 2 divided doses) increase at 1–2-week (Max;16mg/day)
Uses	Systemic HTN & Cardiac Failure and MI - to prevent ventricular re-modeling Diabetic Nephropathy - to reduce proteinuria The combination of ACE-I with ARB may reduce proteinuria
Contra	Impaired renal function (Creatinine > 3 mg/dl) Renal artery stenosis, Aortic stenosis, HOCM, Carotid stenosis Pregnancy
S/E	Postural Hypotension Dry cough
Monitor: Serum K^+ & Creatinine during treatment, if 30% ↑ in serum creatinine : stop the drug	

ARBS:

Action	They are powerful arteriolar and venous dilators
Drugs	Losartan (Losanta) 25-50 mg/day. Candesartan 8-16 mg/day Valsartan 80-160 mg/day. Irbesartan 75-300 mg/day, Telmisartan 20-80 mg/day
Uses, Contra	Their indications and contraindications are same as ACE Inhibitors
Advantage	Incidence of dry cough is less common (over ACEi)
Monitor: Serum K^+ & Creatinine during treatment, if 30% ↑ in serum creatinine : stop the drug	

CCB (Calcium channel blockers):

Action	They produce arterial Vasodilatation
Drugs	Nifedipine Short acting preparation 10 to 20 mg TDS. Long-acting preparation 10 to 20 mg SR BD Amlodipine 5 to 10 mg daily (Safe in Elderly) Lercanidipine-10 mg OD, increase to 20 mg OD after 2 week if needed. Cilnidipine 5 mg, 10 mg OD-(t has lower incidence of Pedal edema, it does not cause reflex tachycardia
	Diltiazem: Diltiazem Short acting 30 mg TID Diltiazem controlled release 60-120 mg BD Verapamil 40-80mg TID Controlled release 120-140 mg OD
Uses	Systemic hypertension, Peripheral Vascular Diseases, Raynaud's phenomenon Antiarrhythmic (atrial fibrillation)-mainly Verapamil/Diltiazem ischemic heart disease-Dibarium Prinz metal's angina – Diltiazem Subarachnoid hemorrhage: Nimodipine , Pulmonary hypertension: Nifedipine
Contra	Cardiac Failure, 2nd or 3rd degree heart block (Diltiazem, verapamil)
S/E	Headache Bradycardia, (Diltiazem, Verapamil), Tachycardia (Nifedipine)Pedal edema
The use of sublingual short-acting Nifedipine in hypertensive emergencies is neither safe nor effective and SHOULD BE ABANDONED! Serious adverse events (cerebrovascular ischemia, syncope, heart block, stroke, sinus arrest, severe hypotension acute myocardial infarction, ECG changes, and fetal distress) have been reported in relation to such use **Caution**-Parkinsonism is a frequent side effect of some CCBs. CCB-induced parkinsonism usually improves spontaneously after discontinuation of the offending drug	

DIURETICS:

Class	Drugs	Adverse effects
Thiazide Diuretics	Hydrochlorothiazide 12.5-25 mg OD Indapamide 1.5 mg OD and Metolazone 2.5-5 mg OD	Hyperlipidemia. Hyperglycemia. Hyperuricemia, Hypokalemia
Loop Diuretic	Furosemide 20-320 mg/day (Combinations with Furosemide + Spironolactone also available) Torsemide5-10 mg/day	
Potassium Sparing Diuretics		

Beta blockers:

	Cardiac selectivity	Usual dose
Atenolol (Normitab, Zafnol) 25mg, 50mg	+	**Dose;** 25-50 mg BD
Bisoprolol (Concor) 2.5mg, 5mg, 10mg	++	**Dose;** 5-10 mg OD
Metoprolol (Merol) 25mg, 50, 100mg	+	**Dose**; 25-50 mg BD, 25/50/100 mg OD
Propranolol (Inderal) 10mg, 20mg, 40mg	0	**Dose**; 10,20 mg BD, 40 mg OD it is not used routinely in hypertension
Newer Drugs: Carvedilol - It blocks both α and β adrenal receptors, Dose 3.125, 6.25, 12.5. 25 mg Nebivolol (2.5,5 mg)- Highly β-1 selective and modulates nitrous oxide release, Dose 2.5-5 mg OD (relatively safe in asthmatic patients)		

Alpha blocker:

Action	They produce peripheral arteriolar and venous dilatation
Drugs	Prazosin 2 to 5 mg (extended release at bedtime) Minipress XL 2.5 15 mg) Doxazosin 1 to 4 mg/day HS Terazosin 1 to 5 mg/day HS Phenoxybenzamine 20-120 mg/day (not used for hypertension) Tamsulosin for BPH 0.4 mg once daily -30 minutes after the same meal each day, dose may be increased after 2-4 weeks to 08mg once daily in patients who fail to respond
Uses	Uncontrolled Hypertension, Pheochromocytoma
S/E	Postural hypotension (use during bed time, advice the patient not to get up from bed suddenly, it may produce postural syncope)

Centrally Acting Anti-hypertensive:

Centrally acting Adrenergic antagonists	**Clonidine** 50-150 mcg TID **Alpha Methyl Dopa** 250 to 500 mg BD or TID
Uses	Clonidine (mainly in uncontrolled HTN) α-Mthyldopa (mainly in HTN in pregnancy
Side effects	Hypotension, drowsiness, dry mouth

Others:

Hydralazine	10 mg QID
Sodium Nitroprusside	Infusion 0.3-2 mcg/kg/min Caution; Renal Failure, cerebral ischemia, raised ICT Side effect: Cyanide toxicity, Methemoglobinemia
Reserpine	0.1 to 0.5 mg/day

ANTI-HYPERTENSIVE IN SPECIAL CONDITION:

HTN with Co-morbidity	Choice of anti – Hypertensive
HTN + Heart failure	ARBS + diuretics + beta blockers • Tab valsartan + hydrochlorothiazide 25/12.5mg 1 + 0 + 1 continue • Tab Carvedilol 3.125mg 1 + 0 + 1 – continue
HTN + DM (Diabetes mellitus)	**ACEI / ARBs:** Tab losartan (Losanta) 25mg or 50mg 1 + 0 + 0 continue
HTN + Angina	Beta blocker or calcium channel blocker Note: Never prescribe beta blockers and rate limiting CCB simultaneously
HTN + CKD	**ACEI /ARBS:** Tab losartan (Losanta) 25mg or 50mg 1 + 0 + 0 continue
HTN + BPH	**Alpha blocker:** Tab Prazosin 1mg or 2mg 1 + 0 + 1 __ continue
HTN + Asthma	CCB, ACEI, ARBs, diuretics • Tab Amlodipine (Sofvas) 5mg or 10mg 1+ 0 + 0 __continue Beta-1 selective blockers are safe in asthma, COPD (Bisoprolol, metoprolol)
HTN in pregnancy (Special situation)	Labetalol (Isochoric), Nifedipine, & Methyl dopa are safe • Tab labetalol 100mg 1 + 0 + 1 __continue
HTN + Post MI	**ACEI, ARB Beta blocker**
Recurrent stroke	**ACEI, ARB:** Tab losartan 5mg or 10mg 1 + 0 + 0 __continue
Isolated Systolic HTN Systolic BP >/ 160mmHG	**1) Diuretics (thiazide)** • Tab Indapamide 15mg 1+ 0 + 0 __continue **OR** **2) CCB** • Tab Amlodipine 5mg or 10mg 1 + 0 + 0 __continue

Hypertensive Urgency: BP ≥180/120 mmHg without end organ damage

Hypertensive emergency: Markedly elevated BP > 180/120 mmHg with end organ damage

Note:

1) Sudden reductions in BP Should be avoided as it may precipitate Coronary, Cerebral of renal Ischemia this is why the use of Sublingual Nifedipine preparation should be avoided.
2) With Sudden reduction in BP Ischemic damage can occur in vascular bed that have become habituated with the higher level of BP (i.e., Auto regulation)
3) MAP (mean Arterial pressures) should be reduced gradually for most Hypertensive emergencies by 10 to 20% in the first hour and by further 5 to 15% over the next 23 hours
4) Target BP For first hours BP < 180/120 mmHg AND Target BP for next 23 hours BP < 160/110 mmHg
5) In Aortic dissection systolic BP should be rapidly reduced to a target of 100 to 120 mmHg (in 20 minutes)
6) Severe Autonomic dysfunction (e.g Guillain-Barre & multiple systemic Atrophy syndromes or acute Spinal cord injury) can be associated with Hypertensive emergency so Can be treated with Labetalol, Phentolamine or Nitroprusside
7) Hypertensive crisis in Pheochromocytoma is treated with Sodium Nitroprusside Phentolamine or Nicardipine
8) Head with raised ICP, hypertension in this case only treated if Cerebral perfusion pressure (MAP minus ICP) is > 120 mmHg and the ICP > 20 mmHG
9) i) High BP in acute Ischemic Stroke usually fall spontaneously, anti-hypertensive only be used if BP > 220/120 mmHg. reduce BP slowly by 10 - 15% if planning for Thrombolytic treat If BP > 185/110 mmHg
   ii) In Hemorrhagic stroke: target MAP is < 130 mmHg
   i) In acute Subarachnoid hemorrhage as long as the bleeding is not stopped the target should be systolic BP of 110 - 120 mmHg and is known HTN patient BP should be treated to 20% below baseline pressure

HYPERTENISVE EMERGENCY

Definition: BP > 180/120 with end organ damage Such as (see chief complaints)

Chief complaints:

- *Headaches irritability and Confusion (Hypertensive encephalopathy)*
- *Hematuria, proteinuria, progressive Renal failure (Hypertensive Nephropathy)*
- *Acute MI*
- *Acute LV failure with Pulmonary edema*
- *Intracranial hemorrhage, Aortic dissection*
- *Pre-eclampsia, eclampsia*

Finding

- *Look for evidence or Hx of acute head injury or trauma Generalized neurological Symptoms like agitation, delirium, stupor, Seizures*
- *Focal neurological symptoms (due to Stroke)*
- *Fresh flame hemorrhage, exudates*
- *Papilledema, Nausea & vomiting (in ↑ ICP)*
- *Chest discomfort (due to MI or Aortic dissection*
- *Acute severe back pain (in Aortic dissection)*
- *Dyspnea Pulmonary edema & cardiac failure)*
- *Pregnancy (eclampsia, pre-eclampsia)*

Drug: *cocaine, amphetamine, phencyclidine monoamine oxidase inhibitors or recent Stoppage of Clonidine.*

Rx: Date: Time:

- Admit in hospital (CCU/ICU)
- In first hour

Inj. Labetalol 50mg/10ml 4ml (20mg) IV slowly over 2minutes. Then wait for 15 minutes check BP if still BP high then Repeat 4ml to 8ml every 10 minutes (up to 300 (or 60ml) until desire BP is reached or Start Continuous infusion 2mg/min (1-3mg/min after initial bolus)

- ✓ Maximum I/V dose: 300 mg (or 60 ml)
- ✓ Maximum oral dose, 2400 mg
- ✓ Reduction of MAP by no more than 25%.

Desire BP: In range of 160/100-110 mmHg

MAP: (Mean Arterial pressure)

MAP=Diastolic pressure + 1/3 pulse pressure

Pulse pressure = systolic Pressure – Diastolic Pressure

e. g Patient BP 220/120 mmHg so his MAP will be

MAP = 120+1/3 (220 - 120) = 120 +1/3 X100 = 153 mmHg (25% of 153 is 38)

So, after 25% of reduction MAP should be

(153-38 = 115 mmHg so repeat dose of 8ml albert after every 10 minutes till MAP is 115 mmHg or BP become 160/110 mm Hg

CONDITION	DRUG OF CHOICE	THERAPEUTIC GOALS
Aortic dissection	*IV labetalol infusion*	SBP=100-120 mmHg HR< 60 b/m
Pulmonary edema	*IV Furosemide bolus, I/V NT4 infusion, IV Nitroprusside (ICU)*	Reduction a BP by 20-30%
Acute MI	*IV Metoprolol bolus, I/V NT4*	Reduction a BP by 20-30%
Acute Renal failure	*IV Labetalol bolus , I/V Furosemide*	Reduction a BP by 20-30%
Eclampsia	*IV Lebetol-1 bolus*	Maintain BP 140-150/90-110
HTN Encephalopathy	*IV Labetalol infusion*	Reduce MAP by 15-20%
SAH	*IV Labetalol infusion, I/V esmolol*	SBP< 160mmHg MAP < 130
Intracranial Hemorrhage	*IV Labetalol bolus/infusion, IV Esmolol*	In raised ICP MAP = 130mmHg if no raised ICP MAP= 110 mmHg
Acute Ischemic stroke	*IV Labetalol bolus/infusion IV Nitroprusside (2nd live)*	Treat if BP> 220/120 mmHg low BP >10-15% in 1st 24 hour avoided

DRUG	DOSE	SIDE EFFECTS
Labetalol (injection 50mg/10ml) **Mode of action** Selective of and nonselective beta-adrenergic blocking Action **Safe in pregnancy & in patient with CAD since it doesn't increase heart rate**	Indication ➢ Pre-eclampsia, eclampsia ➢ Acute stroke with High BP (>220/120) ➢ Hypertensive urgency & emergencies Dose Initially 20mg (4ml) IV Over two minutes may repeat May repeat 40mg to 80mg every 10minutes (maximum 300mg IV) or Start Continues infusion 2mg/min (range 1 to 3mg/min) Until desire BP is reached	1) Hypertension 2) Bronchospasm so avoided in COPD, asthma 3) Bradycardia & heart block (so avoided in heart failure bradycardia, heart block 4) Labetalol should not be used without prior adequate alpha blockage in patient with Pheochromocytoma or cocaine or methamphetamine over dose
Nitroglycerin (NGT) Mode of action: Vasodilator	Dose: Start with 5mcg/kg/min Increase by 5mcg increment every 5 minutes until BP response is noted (can be dilated in 5% dextrose or NS) Tolerance may develop after 12 to 24 hours (Stop the infusion)	1) Headache 2) Nauseas 3) Hypotension 4) Bradycardia Tolerance may develop if administrated > 24 hours
Sodium Nitroprusside (SNP) Mode of action: • Vaso dilator • Potent, Short acting Note: It is light Sensitive So wrap Infusion bottle and drip set with aluminum foil to protect from light	Indication: Hypertensive emergency Dissecting Aortic aneurysm Acute Cardiac failure Acute VSD & MR Dose: - Start 0.3 mcg/kg/min Usual dose 2 to 5 mcg/kg/min	1) Hypotension in hepatic or renal failure so contraindicated in Severe Liver disease 2) Methemoglobinemia with prolong treatment (>24 – 48 hr) 3) Dose related decline in Coronary renal & Cerebral Perfusion Contraindicated in • Severe liver disease • Pregnancy • Severe Optic Atrophy • Vit B12 deficiency • Amblyopia in renal failure

ANGINA

Definition: Cardiac Pain due to myocardial ischemia, Type Stable & unstable. NICE define as

1) Constricting discomfort in the front of chest, neck, shoulder, jaw or Arms
2) Precipitated by physical exertion 3) Receive by rest or GTN (Angised) in about 5 minutes

- Patient with all 3 feathers have typical angina
- Patient with 2 feathers have Atypical angina
- Patient with 1 or none have non-angina chest pain

UNSTABLE ANGINA (UA) AND NSTEMI

Chief Complaint:

- Constricting discomfort in chest, throat Arm, back, epigastrium, Breathlessness
- Nausea, Sweating, Vomiting
- Fear of impending death for past
- Last for more than 30 minutes

Medical HX: Hypertension, type 2 DM, Ichemic heart diseases

Personal HX: Smoking, Alcoholic

O/E: Vitals (pulse, BP, SPO2%, Temp, RR)

Investigation:

(1) ECG (T wave inversion, ST depression)
(2) Trop I (elevated in NSTEMI not in UA) so if no detectable biomarker of MI after 12-18 hours then its unstable angina
(3) RBS, Lipid Profile, RFTs
(4) CXR (look for cardiomegaly, PE)
(5) Echo, Coronary angiogram

Invasive therapy:

According to AHA/ACC guideline

Invasive Therapy (in chronic UA)

PCI + Stenting: single vessel or double vessel disease

CABG : 1) Triple vessels disease 2)Left main disease 3)Diffuse arterial disease

Rx: **Date:** **Time:**

- **Maintain ABC** (airway, breathing, circulation)
- **O2 inhalation** 4-6 L/min stat then SOS (If SPO2 <94%)
- **Tab Aspirin 300 mg (Disprin)** 1 tabs stat & then **Tab Loprin OR Ascard** 1+0+0 continue [75-81mg/day]
- **Tab Clopidogrel 75mg (Lowplat, Plavix)** Stat dose; 4-tab stat and if age more than 75 1 tab stat Contnious dose; 1+0+0 for 9-12 months
- **Inj. Morphine 5mg** (5-10mg IV dilute in 5 ml NS 0.9%) **PLUS** Inj. Metoclopramide 10mg (Metomide) IV stat **OR** **Inj. Nalbuphine 10mg/ml (Nalbin)** IV slowly stat **PLUS** Inj. Dimenhydrinate (gravitate) IV stat
- **Tab Glyceral Trinitrate 0.5mg (Angised)** 1 tab S/L stat can repeat after 15 min (for pain)
- **Inj. Enoxaparin (clexane)** 60mg (600 IU) SC state then BD for 3 days
- **Inj. Isosrobide dinitrate (Isoket)** 10mg diluted in 100ml NS IV@4 drops/min [6-12ml/hour] if BP high. until angina disappear or MAP ↓ by 10%
- **Inj. Onset (Ondansetron) 8mg** IV stat & SOS
- **Tab pantoprazole 40mg (Protium, zopent)** 1+0+0 14 days
- **Tab Atorvastatin 40mg (Lipiget, Atorva)** 1 tab stat then 0+0+1 (at night) OR
- **Tab Rosuvastatin 20mg (RAST)** OD at night

Beta blocker: (indicated after reperfusion or in long term conservative tx)Atenolol or Metoprolol

- **Tab Metoprolol (Merol, Carsel)** 25-100mg 1+0+1 life long

If β-blocker contra or can't be tolerated then:

- **Tab Diltiazem (Herbesser)** 30mg-60mg TDS **or** **Tab Verapamil (Isoptin)** 40-120mg TDS life long

Myocardial infarction (MI) STEMI

Definition: A Clinical (or pathologic) event caused by Myocardial ischemia in which there is Evidence of myocardial injury or necrosis.

Chief Complaint:

- Prolong chest pain (>30 minutes) That radiate to throat, arms, Jaw, back, epigastrium
- Anxiety, fear, sweating
- Fear of impending death Nausea & vomiting
- Breathlessness (LV failure)
- Collapse/syncope (LV failure, heart block)

Physical signs:

1. **Signs of sympathetic activation**
   - Pallor, sweating, tachycardia
2. **Signs of vagal activation**
   - Vomiting, bradycardia
3. **Signs of impaired myocardial function**

- Hypotension, oliguria, cold peripheries
- Narrow pulse pressure, Raised JVP
- Soft first heart sound
- Third heart sound (S3)
- Diffuse apical impulse
- Lung Crepitation's (Pulmonary edema)

4. **Signs of tissue damage :** Fever
   - Signs of complications, e.g. MR, pericarditis

Investigation:

1. **ECG**

➢ **STEMI**: ST elevation MI

- Progressive loss of R wave
- Q wave , T wave inversion

➢ **NSTEMI** : Non ST elevation MI

- ECG may be normal, T wave inversion
- Elevated cardiac enzymes

2. **Trop-**I (if ECG normal)
3. Lipid profile, RBS, CXR
4. Serum electrolyte & serum creatinine
5. **Echo** (Echocardiography)

Rx: **Date:** **Time:**

- **Maintain ABC** (airway, breathing, circulation)
- **O2 inhalation** 2-4L /min stat and then SOS
  (In hypoxia: SPO2 <92%)

FOR PAIN:

- **Inj. Morphine 5mg** (5-10mg IV dilute in 5 ml NS 0.9%) **PLUS**
  Inj. Metoclopramide 10mg (Metomide) IV stat **OR**
- **Inj. Nalbuphine 10mg/ml (Nalbin)**
  IV slowly stat **PLUS** Inj. Dimenhydrinate (gravitate) IV stat

Antiplatelet:

- **Tab Aspirin chewable 300mg (Disprin)**
  Loading dose: 1 tabs stat (300mg)
- **Tab Clopidogrel 75mg (Lowplat, Plavix)**
  Loading dose: 4 tabs state or 1 if >75 years

In patient to be managed with PCI : then use Prasugrel or Ticagrelor instead of Clopidogrel

- **Tab Ticagrelor 90mg (Verata, Anaplag)**
  Loading dose : 180 stat then 90mg BD

Beta Blocker:

- **Tab Metoprolol 25mg, 50mg (Merol)**
  1+0+1 (12.5-50mg BD)
  (Contraindication: Asthma, heat failure, hypotension, heart rate < 60, acute cocaine intoxication with chest pain) **OR**
- **Tab Carvedilol 6.25mg (Carveda)**
  1+0+1 (6.25-25mg BD)

Statin therapy: (Lipid lowering drug)

Early statin therapy initiation (within 24 hours)

- **Tab Atorvastatin 20mg ()**
  4 tabs (80mg) state & then 1 tab continue **or**
  Tab Rosuvastatin 20mg (Rovista, RAST) OD

For anti-coagulant:

- **Inj. Enoxaparin (Clexane) 60mg** S/C BD for 3 days [OD in real disease]

Anticoagulant & Thrombolysis see next page

❖ **RX on discharge:**

❖ **Tab Aspirin 75mg (Loprin, Ascard)** 1+0+0 continue **but if After PCI, fibrinolytic therapy for ACS;**
Then Tab Aspirin + Clopidogrel (Ascard plus, Lowplat plus) 75/75mg 1 tab OD for 1 year

❖ **Tab Rosuvastatin 20mg (Rovista, RAST)** 0+0+1 at night

❖ **Tab Metoprolol 25mg, 50mg (Merol)** 1+0+1 (12.5-50mg BD) or **Carvedilol** 6.25-25mg BD

❖ **Tab Ramipril (Rami pace) 1.25-5mg OD**

❖ **Tab Glyceral Trinitrate 0.5mg (Angised)** SOS or **Tab Glyceryl trinitrate (Sustac)**2.6 BD (for pain)

❖ **Tab pantoprazole 40mg (Protium, zopent)** 1+0+0 for 14 days

Localization	ST elevation	Reciprocal ST depression	Coronary artery
Anterior MI	V1-V6	None	LAD
Septal MI	V1-V4, disappearance of septum Q In leads V5, V6	none	LAD-septal branches
Lateral MI	I, aVL, V5, V6	II, III, aVF	LCX or MO
Inferior MI	II, III. aVF	L, aVL	RCA; 80% or RCX; 20%
Posterior MI	V7, V8, V9	High R in V1-V3 with ST depression & V1-V3 > 2mm; mirror view	RCX

❖ ECG CRITERIA FOR STEMI: 2mm of ST segment elevation the 2 or more contiguous chest leads for men & 1.5 mm for woman (who tend to have less ST elevation) & > 1mm in other leads

- new onset left bundle brank block (LBBB) in 7 % with acute MI

Interventions

❖ **Primary percutaneous coronary intervention (PCI);** in patients with STEMI & ischemic symptoms of < 12 hrs

❖ **CABG-coronary artery bypass graft surgery (CABG**); The main indications for urgent CABG
Failure of fibrinolysis or PCI, or hemodynamically important mechanical complications.

❖ **Thrombolysis/Fibrinolytic**

➢ If patient comes within 12 hours and ST-segment elevation of at least 2mm in two contagious precordial leads and 1mm in two adjacent limb leads is present.
Inj. Streptokinase 1.5 million/unit 1 Vial in 100 ml NS IV @ 25 microdrops/min or over 1hour

➢ Thrombolysis should ideally be initiated > 30 min of presentation, fibrinolytic therapy should be initiated within 10 minutes of ECG diagnosis of STEMI

➢ Alteplase (t-PA): IV bolus 15mg following by 0.75mg/kg body weight

➢ IV Reteplase: 10 units over 2 minutes then repeat 10-unit bolus at 30 minutes.

Contraindication to thrombolytic therapy; 1) Active internal bleeding **2)** Uncontrolled hypertension 3) Recent surgery (within 1 month) **4)** Previous subarachnoid or internal hemorrhage 5) Recent trauma

❖ ANTI-COAGULANT:

➢ IF Inj. streptokinase can't be given then

➢ Inj. Enoxaparin (clexane) 60mg (600 IU) S/C state & then BD around umbilicus 3 days **OR**

➢ After completion of the thrombolytic infusion, anticoagulation with IV heparin [Bolus 60-70 U/kg (max 5000 U) IV followed by infusion of 12-15 U/kg /h (initial max 1000U/h) titrated to maintain a continued for at least 24 hours after alteplase, reteplase, or Tenecteplase.

➢ Enoxaparin 1mg (100U) /kg SC/VI BD) (inj. clexane then 40mg/0.4ml OD) the first dose should be administered with the IV bolus. **OR**

➢ Fondaparinux 2.5mg SC OD (not recommended in patients undergoing primaryPCI)

WARFARIN: Available 1,2,3 and 5 mg tabs

- Warfarin should be started along with Heparin; Heparin should be continued until INR of at least 2 are achieved on 2 consecutive days **Start loading dose** 10 mg/day initially then taper according to INR
- Check PT/INR daily till it attains target value, then once a month or in case any new drug is started to the patient (drug interaction)

- **Acenocoumarol: 1,2,4 mg Tab**

Rheumatic fever (RF)

Definition: Multi System disease resulting from autoimmune reaction to infection with Group A streptococci, usually of the upper respiratory tract (i.e. pharyngeal infection) Common age group: 5-15 years.
Involves: Heart, Joint, CNS Skin & Subcutaneous tissue

Chief Complaint:

- Fever, Anorexia, Lethargy, GBA
- Polyarthritis (60-70% cases), Pan-Carditis
- Joint pain (large joint & migratory)
- Breathlessness, palpitation, chest pain
- Past H x of Sore throat (2-3 week back)

O/E:

- Vitals, JACKLET
- Myocarditis (Relative tachycardia, S3/S4 gallop)
- Endocarditis; MR, Carey Coombs murmur
- Pericarditis pericardial pain, rub and small effusion
- Small, painless nodule (s/c nodules) over bony prominence
- Erythema marginatum; erythematous pink rashes with clear Centre with Serpiginous margins over trunk and proximal parts of extremities
- Sydenham's chorea; sudden, aimless, irregular movement associated with Hypotonia & emotional instability

Investigation:

CBC (Leukocytosis)

1) ESR, Acetifier (both raised
2) CXR CPA View); cardiomegaly, pulmonary congestion
3) ECG; T-wave inversion prolong PR interval
4) Echo: Cardiomegaly, value deformity(mitral)

Rx: **Date:** **Time:**

- **BED REST:** Reduce joint pain and Cardiac workload
- **Tab chewable Aspirin (Disprin) 300mg**
  2+2+2+2 (100mg/kg/day in 6 divided doses (maximum 8mg/day)Continue till the ESR become normal) low doses in children's
- **Inj. Benzathine Penicillin (Benzibiotic) 1.2 million unit**
  1 vial IM stat (in gluteal area)
  weight >30 kg Then 1.2 million unit
  weight <30 kg Then 0.6 million unit **OR**

Procaine penicillin 6 lac unit IM OD –10 days

If patient is allergic to penicillin: then

- **Tab Erythromycin 250 mg (Erythrocin)**
  1+1+1+1 for 10 days (children:40mg/kg/day)

In Carditis or severe arthritis then add steroid:

Tab prednisolone 5mg (deltacortil)

2 + 0 + 2 (1-2mg/kg) Until the ESR become normal then tailed off

Rx on discharge

- **Inj. Benzathine penicillin (Benzibiotic)** 1.2 million unit
  1 vial IM every month – up to age of 21 or
  5 years from attack which is longer
- If residual heart disease present then Until 10 years after the last episode or 40 years of age whichever is later
  Weight < 30kg = 1.2 million unit
  Weight < 30 kg = 0.6 million unit

Note; Salicyclate use for symptomatic tretament
There is no proof that cardiac damage is prevented by steriod

Diagnosis: Revised **JONES CRITERIA**:

MAJOR: remember **JONES**	**MINOR:**	**Essential supportive**
J= Joint (Monoarthritis, polyarthritis , polyarthralgia) 0: Carditis(clinical or subclinical) N; Nodule (subcutaneous) E; Erythema margination. S: Sydenham's chorea	Fever, Arthralgia, Raised ESR or & raised CRP, Prolong PR interval (unless Carditis is a major criterion), leukocytosis,	➢ Raised ASO, + throat culture, recent scarlet fever, evidences of antecedent group A Streptococcal infection ASO > 250 Todd U in adult ASO > 333 Tu in children or elevated **OR** ➢ Anti deoxyribonuclease B (ADB)

Diagnosis: Recent streptococcal infection(raised ASO titer OR throat cultures growing GABHS)
PLUS 2 Major criteria **OR** 1 major criterion and 2 minor criteria
OR we can also say 1 major + 2 minor + 1 essential

PROPHYLAIS:

PRIMARY PROPHYLAXIS: Patient with group A Strep pharyngitis with suspected acute RF sequels(e.g past history of RF, RF with joint diseases or heart disease): TX of strep Pharyngitis to prevent RF.	SECONDARY PROPHYLAXIS: (give long acting penicillin)
Inj. Benzathine Penicillin 1.2 million unit 1 vial IM stat (in gluteal area) single dose (if weight < 0.6 million unit) **OR** Inj. Penicillin PP6 IV for 10 days **OR** Cap Penicillin V 250mg QID **OR** Cap Amoxicillin 500mg BD for 10days **If Penicillin allergic then:** Tab Erythromycin 250 mg (Erythrocin) 1+1+1+1 for 10 days (children:40mg/kg/day) **OR** Tab Azithromycin 250mg (Azitma) 2 tab stat, then 1 tab daily for 4 days **OR** Tab Clindamycin 300mg TDS 10 Days	**Inj. Benzathine penicillin** 1.2 million unit **IM** once in 3 week (0.6 million if weight <30kg) **OR** Cap Penicillin V 250mg BD if penicillin + allergic then Tab Erythromycin (Erythrocin) 250mg BD

- If there is no evidence for Carditis preventive therapy can be stopped at age 21 yeas
- In the setting of Carditis prophylaxis should be continue until the patient is a young adult, which is usually approximately 10 years from the initial acute attack with no recurrence. Antibiotic prophylaxis should be continue even after valve surgery, including prosthetic valve replacement
- In highly endemic area or if Carditis has occurred with residual Valvular involvement prophylaxis can be stopped after age 40 years or 10 years after the last episode, whichever is longer

BRADYCARDIA

Definition: Heart rate < 60 beats/min, clinically significant if persistently <45 beats/min
Causes: physiological (trained athletes, sleep) Pathological (Hypothyroidism, cardiac block, raised ICT, Obstructive Jaundice) and drugs (Beta-blocker, Digoxin, Diltiazem, Verapamil)

Chief Complaint:

- Near -fainting or fainting (syncope)
- Dizziness or light headedness, SOB
- Fatigue: Easily tiring during physical activity
- Chest pain, confusion or memory problems

Past Hx: If any and check vitals
Investigation: 12 lead ECG, RBS, Serum electrolyte
Sinus Bradycardia (regular QRS)
Normal P wave, PR internal, RR interval are equal & every P wave followed by a QRS complex
Sick sinus syndrome: Dysfunction of SA node mainly occurs in elderly associated with Sinus Brady, Sinus arrest Paroxysmal SVT & AF, AV block
Second degree type I block-MOBITZ I
Wenckebach phenomenon, progressive lengthening PR interval with intermittent dropped ORS beats.
Second degree type II block-MOBITZ II
Internet dropped beats without any progressive. lengthening of the PR intervals the PR intervals remain constant in most of beat's ORS missed usually in repeated cycle of 2nd, (2:1 block),
3rd (3: 1 block) or 4th (4: 1 block) P wave
Third degree block (complete heart block)
➢ no relationship between P & QRS , but QRS normal

RX Date: Time:

Acute Symptomatic bradycardia

- **Inj. Atropine 1mg diluted in 3-5ml NS** IV every 3-5 mins [to max total dose of 3mg]

If patient fail to respond to Atropine or in heart block (2nd type2 or 3rd) , in acute MI then

- **Inj. Atropine 1mg IV**, max up to 3mg
- **Inj. Isoprenaline 2mg** in 500ml 5% dextrose
- infusion of adrenaline 0.1-1.0mlg/kg/min
- **Transcutaneous Pacing:** Treatment of choice
- IV dopamine or dobutamine

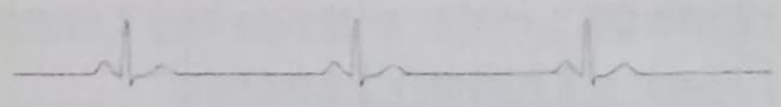
Caution:(use atropine cautiously in)

- The presence of coronary ischemia or MI as it increased heart rate may worsen Ischemia.
- Following cardiac transplantation

Correction of electrolyte imbalance: if present
If pulseless arrest develops: go to pulseless arrest algorithm
Alternate drug to consider:

- **Epinephrine:** (2-10 µg / min) if atropine or pacing fail
- **Dopamine:** 2-10 µg /kg/min alone or added to epineph

Sinus bradycardia:



ATRIAL FIBRILLATION (AF)

Definition; Multiple atrial foci fire impulses at a rate of 350 – 600/minute there is no actual atrial contraction occurs by only fibrillation and the ventricles respond at irregular intervals, usually at a rate of 100 – 140/minute, ECG show absent P wave, irregular QRS complex

Chief Complaint:

- Fatigue, palpitation, syncope, angina
- Cardiac failure & Thromboembolisms, stroke

Past Hx: - HTN, IHD, CVD, Thyroid disease

O/E: Vital , JACKLET, BP; hypotension

- Pulse: irregularly irregular pulse.
- Apex pulse deficit (more than 10 beats).
- Varying intensity of first heart Sound

Investigation:

1) **ECG**
   - Absence of "P" wave
   - wavy baseline due to fibrillary waves
   - QRS Complex Variable in time, amplitude, & Tachycardia
2) **CK and or trop I level** (Rule out IHD)
3) **TSH** (Rule out Hyperthyroidism), Free T4
4) **BNP** (Rule out Cardiac failure)
5) **D-dimer** (Pulmonary embolism workup)
6) CXR PA View, ABG, O2 saturation
7) **Echo**- Chamber dilation (especially atrial)
8) **TEE** (Trans esophageal echocardiography) Evaluate Left atrial thrombus
9) **Holter monitoring** and recording may be helpful, in case of paroxysmal AF

Classification:

- **Paroxysmal AF:** Episodes of AF that terminate spontaneously within 7 days
- **Persistence AF:** Episodes of AF that last more than 7 days & may require either Pharmacological or electrical intervention to terminate (Long acting persistence AF: AF lasted for more than 1 year)
- **Permanent AF:** AF that has persisted for more than 1 year, either because Cardioversion has failed or because Cardioversion has not been attempted

Rx **Date** **Time**

If Patient is hemodynamically Unstable (e.g, shock, pulmonary edema, myocardial infarction)

- Urgent Electric Cardioversion

If Patient is hemodynamically Stable then:

Treatment is ventricular rate control + anticoagulation

A) Rate Control:

1) If BP is good then

- **Inj. Metoprolol (Merol) 2.5-5 mg** IV bolus over 2 minutes. Repeat every 5 minutes (3 doses total) **OR**
- **Inj. Verapamil (Isoptin) 2.5mg** IV Slowly. If no response repeat every 3 minutes (20mg in 20 minutes)
- **Inj. Diltiazem 0.25** mg/kg IV over 2 minutes then 5-15 mg/hour infusion

2) If BP slightly low or resistance AF (to above drugs) or AF with evidence of accessory pathway or in AF with Cardiac Failure then:

- **Inj. Amiodarone (Cordarone)** 300mg diluted in 30-50 ml 5% dextrose IV over 30-60mins

3) If AF with Cardiac failure then:

- **Inj. Digoxin 0.25mg (Linoxin)** every 2 hours up to 1.5mg Then Tab Digoxin 0.5mg OD for 5 days in a week

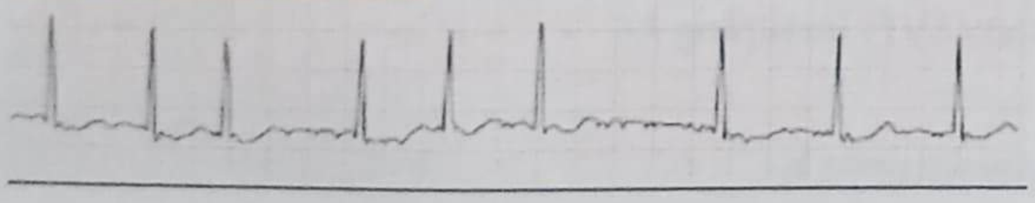
B) Anticoagulation:

Tab warfarin 5mg OD (target INR 2-3) continue

OR Tab Rivaroxaban (Xcept, Rivaro) 20mg 0+0+1 with meal – continue

- In acute setting: Patient with newly diagnosed AF & patient awaiting electrical Cardioversion can be started on IV Heparin (aPTT of 45-60 seconds) or LMW heparin (1mg/kg BD)
- Tab warfarin 5mg P/O OD along with heparin for long standing prevention (keep INR 2-3)
- FOR Non-Valvular AF: Treat with DOAC
- For Valvular AF: Treat with Warfarin

Atrial fibrillation ECG:



CHA_2DS_2 -VASc Score:

- In AF (for anticoagulation and risk assessment of ischemic stroke)
- Most patients are based on risk, as determined by CHA_2DS_2 -VASc Score

CHA_2DS_2 -VASc Score	Points
C: Congestive heart failure or reduce left ventricular ejection fraction (LVEF< 40%)	1
H: Hypertension	1
A2: AGE 75 years or more	2
D: Diabetes mellitus	1
S2: Stroke, transient ischemic attack or thromboembolism	2
V: Vascular diseases (previous MI, Peripheral artery disease or aortic plaque)	1
A: Age 65-74 years	1
S: Sex (Female gender)	1

Interpretation of CHA_2DS_2 -VASc Score:

SCORE	RISK	Anticoagulation therapy
0	Low	No antithrombotic therapy (or aspirin)
1	Moderate	Oral anticoagulant (or aspirin)
≥ 2	High	Oral anticoagulant

BUT AHA/ACC/HRS 2019 SAY;
For male ≥2; start anticoagulant
For female ≥3; start anticoagulant

- NEWER DRUGS : **FOR Non-Valvular AF Or Patient with bioprosthetic valves Choiceof anti-coagulation;**
  - **Rivaroxaban: (Tab Rivaro, Xcept) 20mg Orally OD with meal,** have rapid onset of action, No need of dose adjustment & routine coagulation monitoring
  - **Dabigatran: (Tab)150mg orally BD,** doesn't require serials INR(PT)
  - **Apixaban: (Apiban) 5mg Orally BD,** reduce risk of stroke & systemic embolism associated with AF
- **Anti-coglaution of choices in Rheumatic heart disease or metallic prosthetic valves is; warfarin**
- **Condition where anti-coagulation initiated regardless of CHA2DS2 VASc Score ARE;**
  Rheumatic heart disease, Hypertorphic obstructive cardiomyopathy, previous H/O Stroke/TIA

FOR SINUS RYTHM: (Pharmacological & DC Cardioversion)

A) Pharmacological:

- **Amiodarone:** 15mg/min for 10 min, 1 mg/min for 6 hours
- **Ibutilide: 0.01mg/kg infused slowly over 10 minutes AND Others: Dofetilide, Flecainide, propafenone**

B) DC Cardioversion: (Give sedation with midazolam 2-5mg IV before DC Cardioversion)

- ✓ Cardioversion is most successful when initiated within 7 days after onset AF, and the need may acute when patient is unstable (AF patient with hypotension, heart failure or angina)
- ✓ Anticoagulation with warfarin is indicated in elective DC Cardioversion, or If duration of AF > 48 hours or unknown anticoagulation for ≥ 3 weeks before Cardioversion to reduce chances of strokes
- ✓ Emergency DC Cardioversion, heparin can be given for anticoagulation
- ✓ After Cardioversion anticoagulation should be continued for ≥ 4 weeks in all patients in whom duration of A >48 hours regardless of CHADS-VASc score.

RADIOFREQUENCY ABLATION : **(RFA)most useful TX for many SVTs including AF**

- Catheter ablation of focal triggers of AF
- AV nodal ablation may be alternative in Patient with persistence A

VENTRICULAR TACHAYARDIA (VT)

Definition: Defined as a tachycardia with rate of >100 beats/min (usually 160-240), with ≥ 3 consecutive QRs complexes that originate from the ventricles

Chief Complaint

- Asymptomatic (in some Patients)
- Palpitation, dyspnea, lightheadedness
- Syncope, sudden death

Past history: any heart disease, MI

On examination

- Vital (BP. Pulse, Spo2, Temp), JACKLET

Investigation

1) **ECG**
   - Absent "P" wave, Heart rate; >100 bpm
   - Wide (broad) QRS Complex
2) **Serum electrolytes**

CLASSIFICATION OF VT:

- **NON-SUSTAINED VT:** (VT < 30 Second) VT that terminate spontaneously within 30 seconds
- **SUDTAINED VT:** (VT > 30 Seconds) VT that last for > 30 seconds with significant hemodynamic consequences and need for intervention, further classified as
- **Monomorphic VT:** (Single QRS morphology) Thought-out ECG all QRS complexes in similar Configuration (morphology)
- **Polymorphic VT**: (changing QRS morphology); Continuously changing QRS configuration (morphology) from beat to beat (different QRS complexes on ECG)

Note:

V is contra in **VT (**Verapamil is contraindicated in VT)

Rx Date Time

If Patient is hemodynamically Unstable

(Heart failure, Hypotension, loss of consciousness or after Myocardial ischemia)

- Urgent DC Cardioversion (100-360 J)

If Patient is hemodynamically Stable then:

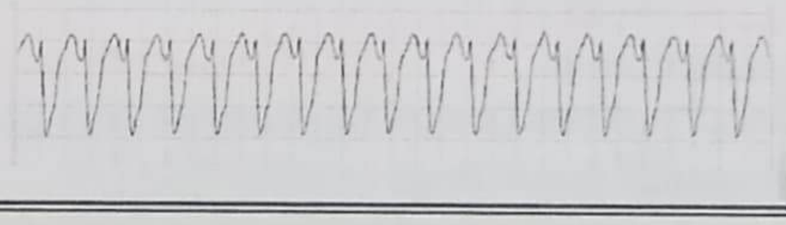
- **Inj. Amiodarone 150mg/3ml (Cordarone)**
  2 amp mix in 20-30 ml 5% dextrose
  IV Over 30-60 minutes, repeat 150mg if needed. Avoid in long QT)
- If no response to amiodarone then do Synchronized DC Cardioversion
- Magnesium replacement (Mgso4= 1-2 g IV) may help especially for polymorphic VT

If VT Occur 24 hours after MI: then add:

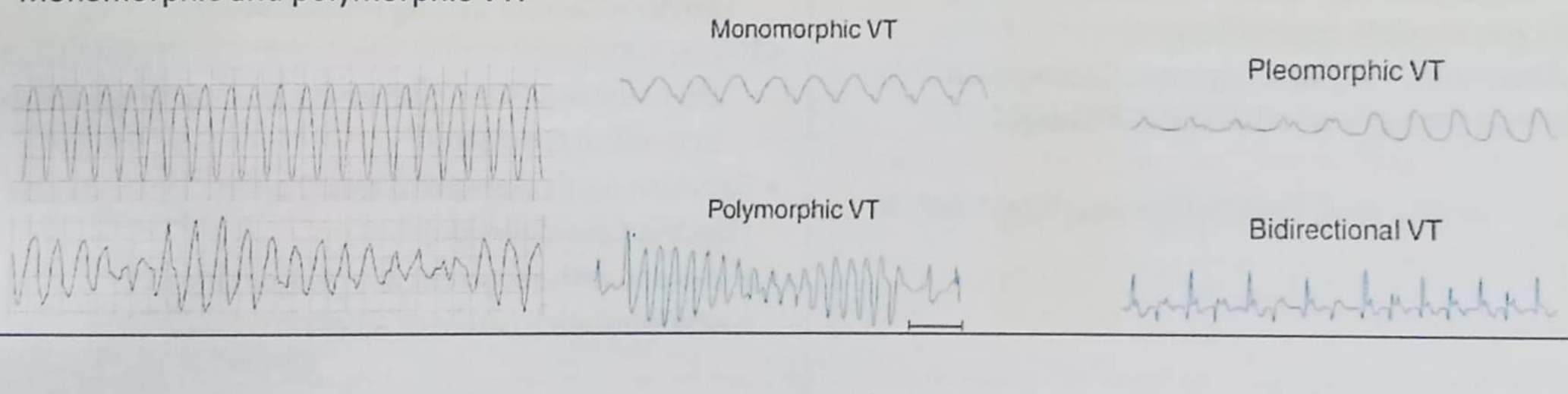
- **Tab Metoprolol (Merol)** 50mg
  1+0+1 (50-100mg BD If good LV function) **OR**
- **Tab Amiodarone (Cordarone) 100mg**
  1+0+1 (100-200mg BD if LV dysfunction)

Synchronized Cardioversion voltage:

- Narrow regular: 50-100 J i.e. SVT & atrial flutter
- Narrow irregular: 120-200 J biphasic or 200 J monophasic i.e. atrial fibrillation
- Wide irregular: defibrillation dose (not synchronized)



Monomorphic and polymorphic VT:



SUPRAVENTRICULAR TACHYCARDIA (SVT)

Definition: It is a rapid heart rhythm originating at or above the bundle of His (HR; 140-240 beats/min) OR Tachycadia that is not ventricular in origion. Episodes are characterized by the sudden onset of a narrow complec tachycardia

Chief Complaint:

- Sudden onset of palpitation
- Rapid and regular heart beat
- Syncope, breathlessness, polyuria
- Angina: due to reduce coronary circulation
- Past Hx: if any (Heart diseases, Asthma)

O/E: Vitals, JACKLET, BP; low or normal

- Pulse: very rapid regular
- CVS examination
- SVT without pulse – PEA If patient doesn't have a pulse, don't call it SVT sweating its cardiac arrest with pulseless electrical activity (PEA)

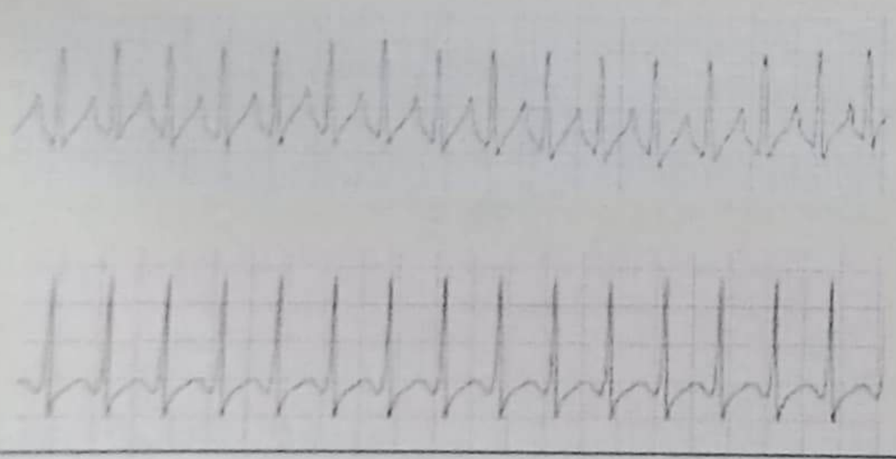
Investigation:

➢ **ECG:**

- Tachycardia (140-240 beats/min)
- Narrow QRS complex
- No visible P waves
- Retrograde P wave (negative P waves) appear after corresponding QRS
- Narrow QRS complex SVT: when tachycardia either atrial (If a bundle branch block or accessory pathway is present-SVT with aberrant pathway) or ventricular (v-tach, v-fib) so they are tracking and often more dangerous

Mnemonic for treatment of SVT; VAVA:

1) **V:** **V**alsalva maneuver
2) **A:** **A**denosine injection (6mg if no response then 12mg if still no response then 12mg)
3) **V:** **V**erapamil (Isoptin) injection (5mg if no response then give another dose of 5mg)
4) **A:** **A**lternative = **A**tenolol injection (2.5mg if no response then give another dose of 10mg)



Rx **Date:** **Time:**

- Bed Rest, 02 inhalation stat and SOS

A) **If SVT without pulse – PEA then:** start CPR and manage according to ACLS Protocol
   - ➢ DC cardioversion

B) For Stable patient (hemodynamically stable)

1) **Carotid sinus massage:** Valsalva maneuver
2) **If no response:** Then Pharmacological treat

- **Inj. Adenosine 6mg/2ml**
  1 amp IV rapidly over 1-2 seconds) followed by a 20 ml 0.9% NS flush and elevate the extremity.
  if no response after 1-2 mins then 2 amp (12mg) IV Rapidly followed by 20ml NS flush elevate the extremity (Total up to 30mg)

Caution: Asthma, COPD, 2nd/ 3rd degree AV block

If still No response or adenosine fail & BP is normal: Then

- **Inj. Verapamil (Isoptin)** 2.5 to 5 mg
  IV over 3-5 mins, if no response then give 2.5-5 mg IV every 3 minutes (total dose: 20mg in 20 minutes (or 2.5-10 mg/hour infusion)

Other options:

➢ Inj Atenolol 2.5mg IV repeat at 5 min interval until 10mg

➢ **Inj. Metoprolol (Merol)** IV 2.5-5mg IV over 2 min. repeat every 5 minutes (up to 3 doses)

➢ **If wide complex tachycardia**

Inj. Amiodarone (Cordarone)150mg in 100ml 5% dextrose IV over 10 mins (15mg/min) Then
Inf. 5% Dextrose 500ml + Inj. Amiodarone 450mg IV @ 32 micro drops/min Then
Tab Amiodarone 100mg (Cordarone)P/O – BD

C) If severe hemodynamic compromise (Hypotension, alter sensorium, or pulmonary edema) or no response to medical therapy

- Sedation (with diazepam) and then DC Cardioversion (Electric Cardioversion)
- If patient with recurrent & symptomatic SVT: Radiofrequency catheter ablation

HEART FAILURE with reduce Ejection Fraction (HFrEF)

Chief Complaint:

- Dyspnea, orthopnea
- Fatigue, lassitude
- Peripheral edema (leg swelling) in Right Ventricular failure
- B/L lung edema (crepts) in LV failure
- Reduce urine out put

Past Hx: HTN, DM, IHD, thyrotoxicosis

Drug Hx: Negative inotropes e. g verapamil, Diltiazem and beta blocker

Personal Hx: Smoking

O/E: Vitals, JACKLET

- BP; low. JVP; raised. Edema; +
- Lung crepts; +. tender hepatomegaly
- Pulses alternans + cyanosis +

Investigation:

1) **ECG** (ischemic changes)
2) **ECHO** (low EF, Valvular lesions)
3) **CXR PA view** (pulmonary edema
   - Enlarge hilar vessels
   - Reticular shadowing of alveolar edema
   - Septal/ kerley's B line
   - Enlarge cardiac silhouette
4) **CBC** (amenia)
5) **Serum electrolyte**(K, Na,MG)
6) **Serum creatinine** (Renal failure)
7) **TMT** (ischemic changes)
8) **USG abdomen** (congestive Hepatosplenomegaly)
9) Lipid profile
10) **Coronary angiography**
11) **B- type natriuretic peptide (BNP)**
    Increase in left ventricular failure and also in renal failure and also in renal failure without HF
    Level above 500pg/ml – consider+

Remember the 4 pillar of heart failure:

1) Beta blocker
2) ACEI
3) Diuretics
4) SGLT2 Inhibitors

Rx: **Date:** **Time:**

- **Bed rest, Propped up position.**
- **Diet:** Salt; 2mg/day, Fluid; 1L/day
- **O2 inhalation stat and SOS**

Diuretics:

- **Inj. Furosemide 40mg (Lasix)** IV stat & BD **OR**
  Tab Spironolactone + Furosemide (Spiromide-40) 1+0+0 continue **OR**
  Tab Furosemide (Lasix) 20mg BD

Beta blocker:

- **Tab Carvidelol (Carveda)** 25mg 1 tab daily
  If β-blocker contraindicated then advice
  Tab Ivabredin (Sivab) 5mg 1+0+1 with meal

ACEIs, ARBs:

- **Tab Ramipril 1.25mg (Ramipace)**
  1+0+1 continue [Increases up to 5mg BD] **OR**
  Tab Losartan(Losanta) 25mg, 50m
  1+0+0

If patient can't tolerate ACEi, ARBs then
Tab Hydralazine 25mg 1+0+1

SGLT 2 Inhibitors:

- **Tab Dapagliflozin 10mg** (Dapa) OD Continue

If Cardiac failure with atrial fibrillation (AF)

- ❖ **Tab Digoxin 0.25mg (Linoxin)**
  1+0+0 3 days in a week

Alternate diuretics

- ❖ Tab hydrochlorothiazide 25mg OD

Alternate ACEI/ARBS

- ❖ **Tab Captopril (Capoten,Capril)**6.25mg
  1+1+1 (increases up to 50mg TDS)
- ❖ Tab Enalapril (Cardace, Zepres)2.5mg, 5mg
  1+0+1 (increases up to 10mg TDS)
- ❖ Tab losartan (Losanta) 25mg
  1+0+1 (25-50mg P/O OD)

If fluid retention is normal then managed with

- ❖ Tab Metolazone (Metxone) 5mg 1+0+0

Pulmonology

Acute exacerbation of ASTHMA (Status Asthmaticus)

Chief Complaint:

- Dyspnea, wheeze, Cough
- Central cyanosis, warm peripheries
- In severe disease, Silent Chest (0 minus sign) respiratory muscle hyperactive,

Past "Hx; HTN, Asthma, DM, Pulmonary TB

On Examination

- Vital (BP, Pulse, Spo2%, Temp) , JACKLET
- Tachycardia, Tachypnea
- Pulses paradoxus

Investigation:

1) **CXR** (PA View), PEFR (Peak Expiratory Flow Rate)
2) **CBC** with **ESR**
3) **ECG** (to access arrhythmias)
4) **Serum electrolyte** (to access Salbutamol induce hypokalemia)
5) **Sputum analysis.**
6) **ABG** (in severe dyspnea)

Monitor

- Vitals, look for signs of respiratory arrest
- PEFR every 25-50 minutes

When to discharge

- ✓ Stable on discharge
- ✓ medication (Nebulization discontinued for at least 24 hours
- ✓ PEF has reached at least 75% of personal best
- ✓ Had inhaler technique checked

Non-invasive ventilation (NIV)VIA:

- Nasal cannula (up to 5L O2),
- Face mask: (up to 10L O2)
- NRB: 10L to 15L O2

Indication for NIV

- Dyspnea (moderate to severe)
- Tachypnea (>25 breaths/min)
- Increase work of breathing muscle (accessory muscles use, pursed lips breathing)
- Hypoxemia (Pao2/Fio2 < 200 mm Hg)
- Moderate hypercarbia (paC02 > 45 mmHg. < 92mmHg)
- Hypercapnic encephalopathy (if not improved in 1-2 hour, intubate)
- Moderate academia (PH < 7.35)

Rx: **Date:** **Time:**

- **Bed rest;** Propped up position (45˚)
- Maintain ABC (Airway, breathing, circulation)
- **O2 inhalation** via Face mask 6L/min O2 stat and SOS (To achieve Spo2% >95%)

Nebulization with

Mild to moderate attack : Nebulization with

- Salbo/ventoline inhaler 2-4 puff every 2-4 hours if not resolves then for mild 2-4 puff salbutamol every 3-4 hours & for moderate attack 6 puff every 1-2 hours

In severe Asthma: Nebulization with

- Albuterol (Ventolin) **2.5-5 mg** diluted in 5-10ml NS nebulize stat, repeat after 30-60 minutes if needed. Then increase the interval b/w doses to 6 hours if the condition of Patient improves
- Ipratropium bromide (Atem) 250mcg diluted in 5-10ml NS Nebulization stat, repeat after 6 hours
- Adrenaline nebulization 2mg over 10 min

- Inj. Hydrocortisone 200mg (Hyzonate) IV stat and BD **OR** Inj. Methylprednisolone (Depo-medrol) 120mg IV stat and BD
- Inj. Omeprazole 40mg (Ruling, Risek) 1 vial iv stat and OD
- Tab Montelukast 10mg (Montika) 0+0+1 14 days

If attack resolves completely: Observe Patient for 4 hours, continue Treatment with

- Salbutamol 2-4 puff every 4 hours for 24-48 hours
- Tab prednisolone 5mg (Deltacortil) 40 mg stat stat then 0.5-1mg/kg for 1 week

Follow up: After 10 days

Note:- Sedative (like benzodiazepine) is Contraindicate in acute severe asthma

There is no role of chest physiotherapy anti-histamine, antitussive drugs in acute condition

Supporting TX

- K+ supplement if hypokalemia present: **Tab Neo-K 500mg 2+2+2**
- If fever, purulent sputum, pneumonia, Sinusitis; **Tab Azithromycin 500mg (Azitma, Zygrel) 1+0+0**—6 days

IF not controlled with above TX : THEN TREAT AS (life threating asthma attack)

- **Admit in ICU AND O2 inhalation** 5L/min (Maintain Spo2% b/w 94-98%)
- **Ipratropium + Salbutamol (Atem + Clenil) nebulization** every 20-30minutes
  Child 1 month to < 5 year; 0.25mg Ipratropium (Atem) + Salbutamol (Clenil) 2.5mg
  Children 5 to < 12 years; 0.25mg Ipratropium (Atem) + Salbutamol (Clenil) 2.5-5mg
  Children age > 12 years; 0.5mg Ipratropium (Atem) + Salbutamol (Clenil) 5mg **OR**
- **Nebulization with Salbutamol** (5mg/ml Continues @8mg/hour (5-10mg/hour) look for S/E (palpitation, tremors)
- **Inj. Hydrocortisone 200mg (Hyzonate)** IV stat and BD
- **If attack resolves after 1 hour;** switch to; Salbutamol aerosol + oral prednisolone

If not improves after 1 hour then:

- **Inf. MgS04 4ml** (2gm) in 100ml NS 0.9% IV over 20 minutes **OR**
- **Inj. Albuterol (Ventolin)** 5mg diluted in 500ml NS IV @ 5mcg/min or IV @ 30 micro drops/min (the adjust according to response)

If previous therapies are not effective and ICU facility is not available then

- **Inj. Aminophylline 250mg + Inf. Dextrose 25%** 20 ml IV slowly over 20 minutes Stat **THEN**
  Inj. Aminophylline 500mg + inf. Dextrose 5% 500 ml IV @250 drops/min or over 24 hour

Cautions: Aminophylline less effective than inhaled salbutamol/terbutaline & theophylline levels should be estimated if the patient is already taking theophylline to exclude theophylline toxicity.

Contraindication: liver disease (or half the dose in if IHD or hepatic dysfunction)

Endotracheal intubation and mechanical ventilation

- **Choice of induction:** ketamine (For induction, IV: 0.5 to 2 mg/kg) and propofol (For induction, IV: 2 to 2.5 mg/kg, for maintenance 3 to 6 mg/kg/hour) have bronchodilatory properties so suitable for severe asthmatic.
- **Paralytic agents**: Rocuronium; induces muscle paralysis at a dose of 1 mg/kg. It has a rapid onset of effect (30 to 60 seconds, IV), with duration of action that is considerably longer than succinylcholine (30 to 40 minutes).
  - Thiopental can cause bronchospasm, should be avoided

Mechanical ventilation: To maintain adequate oxygenation and ventilation while minimizing elevations in airway pressures. This is accomplished by using low tidal volumes (6 to 8 ml/kg), and low respiratory rates (10 to 12/minute).

Asthma VS COPD:

Characteristic	Asthma	COPD
Smoking history	No (or may be present)	Yes (most important cause)
Childhood history	Yes(common)	no
History of Atopic allergy	Common	no
Nature of inflammation	Eosinophilic, CD4-driven	Neutrophil, CD8-Driven
Reversibility of airway obstruction	Mostly reversible	Partially reversible and progressive obstruction
Progression	Intermittent episodes	Continuous
Exacerbations	Inflammatory	Infective
Steroids	Definite Indication	Not very helpful
Antibiotics	Not really indicated)	Definite indication
PFT-FEVI	Low	Low
Improvement in FEV1 after salbutamol nebulization	Reversibility 15% after Salbutamol nebulization	Reversibility 15% after Salbutamol nebulization

BRONCHIAL ASTHMA

Definition; Asthma is characterized by chronic airway inflammation and increased "airway hyper-responsiveness" leading to dyspnea, wheeze, cough and chest tightness.

How to diagnose a case of bronchial asthma

Paroxysmal dyspnea, wheeze, Cough and chest tightness plus any of following

1) **Spirometry**: FEV1 is decrease (<80%) which increase ≥15% (and 200ml) following administration of a bronchodilator (Salbutamol)/ trial of cortcosteriods or
   Increase of 12% or more and 200 ml in FEV1 or FVC after inhaling a short acting bronchodilator (Albuterol)
2) **6 min walk test**: FEV1 ≥ 15% decrease after 6 minute of exercise); exercise induce asthma
3) **Peak Expiratory Flow (PEF);** Diurnal variation: a drop of PEF > 20% during morning on ≥3 days in a week for 2 weeks

Chief Complaint:

- Dyspnea, wheeze, Cough
- Unable to complete sentence in one breath, Central cyanosis, warm peripheries
- Diurnal pattern; Symptoms increase during early morning (nocturnal asthma)
- In severe disease, Silent Chest (0 minus sign) respiratory muscle hyperactive, pulses paradoxus

Past "Hx; HTN, Asthma, DM, Plumonary TB
Drug Hx; NSAID (NSAID induce Asthma)
Occupational Hx: Patient will improve during weekends and holidays

O/E: Vitals, JACKLET, Tachycardia, Tachypnea

- Wheeze on auscultation of chest.

Investigation:

1) **CXR** (PA View) and CBC (Eosinophilia)
2) **Allergy testing, Total IgE (ABPA)**
3) **Sputum analysis, ABG**
4) **Spirometry/Methaholine challenge test** (to conform asthma diagnosis)

Other treatment

- Vaccination for influenza and H1N1; yearly one to be taken
- Always Treat GERD, Avoid triggers reduce weight, graded exercise.
- Treat Anxiety/depression, Rhinitis, sinusitis

Rx: Date: Time:

Avoid Triggers:
Dust, Cold, Smoke, Seasonal variation, drugs, exercise, chemicals, animal/birds products, pollen, Upper respiratory tract infection, emotional expression

- Salbutamol(Salbo) 100mcg Evohaler
  2 puff SOS
- **Budesonide + formoterol (Combivair)** 200/6 mcg MDI 2 puff
- **Tab prednisolone 5mg (Deltacortil)**
  4+0 +4 for 10 days
- **Cap Esomeprazole 20mg (Nexum, Ezomol)**
  1+0+0 for 14 days (to be used with Steroids)
- **Tab Montelukast 10mg (Montika)**
  0+0+1 to be continue (Step3 Treatment)

Treatment; Remember "ASTHMA LOVE"

- **A; A**drenergic: adrenoreceptor agonist
- **S; S**teroids- Oral steroids, then inhaled
- **T; T**riggers to be avoided, **H; H**ydration
- **M; M**DIs -Metered dose Inhaler / spray - Budesonide – Formoterol
- **A; A**lways treat GERD
- **L; L**eukotriene receptor antagonist: Montelukast
- **O; O**malisumab and other Monoclonal anti-bodies
- **V; V**accination for influenza and H1N1
- **E; E**valuate and Educate: Pulmonary function test, CXR

On Follow up: If asthma is under control, then at every 3 months interval. reduce the dose of inhaled corticosteroids by 25 to 50%

Monoclonal Anti-body: for Asthma TX;

- **Anti IgE or Anti IL5:**
  - Omalizumab Dose: SubQ: 150 mg every 4 weeks. Dosing is not dependent on serum IgE
- **Anti IL5:**
  - Mepolizumab: SubQ: 100 mg once every 4 weeks: and Reslizumab: IV: 3 mg/kg once every 4 weeks
    Benralizumab: SubQ: 30 mg every 4 weeks for the first 3 doses, then once every 8week

Asthma PLUS	Comments:
Asthma with Diabetes Mellitus	➢ If necessary can used Corticosteroid but monitor sugar regularly ➢ Insulin therapy may be needed in severe acute asthma ➢ Metformin contraindicates in acute severe asthma ➢ Oral Hypoglycemic (sulfonylurea and pioglitazone) dose should be adjusted if used with aminophylline as it may cause hypoglycemia
Asthma in pregnancy	➢ All inhaler are safe: Beta 2 agonist (both short and long acting), inhaled steroids, theophylline, oral prednisolone are Safe ➢ If patient on Leukotriene receptor blocker, it can be continued
Asthma with pain	➢ Paracetamol and tramadol choice of drug for pain ➢ Avoid NSAIDs like Aspirin, diclofenac etc. ➢ Steroids and DMARDs are safe
Asthma with HTN	➢ Avoid beta blocker However, Cardio-selective can be use ➢ Calcium channel blocker and ARBs (losartan, Valsartan) are DOC ➢ Avoid ACE; at it may induce Cough
Asthma will heart failure	➢ Diuretics is the drug of choice, If tolerated can be continue ➢ Digoxin may be given, Carvedilol may be used in low doses
Asthma with I HD	➢ Anti- anginal, nitrates, CCB (Diltiazem, Verapamil) drug of choice ➢ Clopidogrel preferred over aspirin

STEP 1: As needed low dose ICS –Formoterol

- ❖ **Budesonide + formoterol (Combivair, Easair) 200/6 mcg** MDI 2 puff SOS **OR**
- ❖ **Salbutamol (Ventolin, Salbo) 100mcg evohaler**; 2-4 puff **PLUS**
  Beclamethasone (Clenil) 250mcg inhaler 1-2 puff SOS

STEP 2: Daily Low dose ICS (inhaled Corticosteroids)

- ❖ **Beclamethasone (Clenil)** 50mcg/puff; inhaler 2 puffs TDS
- ❖ **Budesonide + formoterol (Combivair, Easair) 200/6 mcg** MDI 2 puffs SOS

STEP 3: Low dose ICS + LABA OR Low dose ICS +LTRA

- ❖ **Budesonide + formoterol (Combivair, Easair) 200/6 mcg** MDI 2 puffs BD **OR**
  Beclamethasone (Clenil) 50mcg/puff; inhaler 2 puffs TDS **PLUS**
- ❖ **TAB Montelukast (Montika,) 10mg** 1 tab at night

STEP 4: Medium dose ICS+LABA / STEP5: High dose ICS+LABA

Same as step3, just only increase the dose of ICS and
Consider Omalizumab for patients having allergies

STEP 6: step 5 (high dose ICS+LABA) + Oral corticosteroids

- ❖ **Tab Prednisolone (Deltacortil) 5mg (0.5-1mg/kg/day)** in 2 divided dose
- ❖ **Tab Calcium+ cholecalciferol** 1 tab daily for one month
- ❖ **Cap Esomeprazole 20mg (Nexum, Ezomol)** 1+0+1 before meal (till taking steroids

Severe asthma Life threating feature

- ➢ PEF <33% predicted (< 100 L/min), Spo2% < 92, normal or raised Paco2
- ➢ Hypotension, Exhaustion, delirium, coma, Silent chest
- ➢ Respiratory muscle hyperactive: The chest is hyper expanded, and accessory muscles, particularly the sternocleidomastoid, scalene, and intercostal muscles, are used.
- ➢ Pulsus paradoxus: is defined as a fall of Systolic BP 10 mmHg during the Inspiratory phase. Pulsus paradoxus can be seen in cardiac tamponade

How to monitor a patient with acute Severe Asthma

PEF every 15-3 min, **02% Sat** (target >92%), **ABG analysis**, **CXR** (PA) exclude pneumonia

GINA classification of Asthma severity:

Asthma Severity	Symptoms at Day	Symptoms at Night	PEF or FEV	TX
Intermittent	< 1 attack/ week normal physical activity & normal PEF between attacks	< 2 attack/month	>80%	Step1
Mild Persistent	< 1 attack/ week but < 1 attack/day. Attacks may affect activity	> 2 attack/month	>80%	Step2
Moderate Persistent	Daily Attacks (daily symptoms) affect activity	>1 attack/week	60%-80%	Step3
Severe Persistent	Continous symptom, Limited physical activity	Frequent	60%	Setp4,5,6

ACUTE INFECTIVE EXACERBATION OF COPD

Chief Complaint:

- Diagnosed case of COPD
- Breathlessness, Cough with expectorant

Past Hx: Hypertension, COPD, DM, drug Hx

O/E: Vitals, JACKLET

Chest examination: Rhonchi: + , Crypts: +

Investigation:

1) **CXR PA View:**
   Hyper inflated lung, flattened diaphragm
   Rule out infection and pneumothorax
2) **ABG:** Type 2 respiratory failure
   Compensation +, Severe respiratory acidosis need ICU admission
3) **Serum electrolyte, RBS, CBC, CRP**
4) **PEFR**
5) **Spirometry with reversibility**
6) **Sputum C/S** (to rule out infections)
7) **Procalcitonin** (mostly raise in bacterial infection)
8) **ECG**
9) **Blood C/S;** If Fever is present

Note: Theophylline level should be estimated if the patient is already taking theophylline to exclude theophylline toxicity. And contra in Liver disease.

If pulmonary edema: Give

- **Inj. Furosemide (Lasix) 40mg IV**
  40mg (2amp) IV stat

Rx: **Date:** **Time:**

- **Maintain ABC** (airway, breathing, Circulation)
- **Bed rest, Propped up position**
- **Think about infectious exacerbation**
- **02 inhalation 1-2L/min,** Stat and SOS (↑Spo2% up to 84-85%)

Nebulization with:

- ❖ Ipratropium bromide (Atem) 2-4 puff stat TDS
- ❖ Beclamethasone (Clenil) 2cc mix with 5cc NS TDS

- **Inj. Hydrocortisone 250mg (Hyzonate)**
  1 vial IV Stat then 100mg IV TDS **OR**
  Tab Prednisone 5mg (Deltacortil) 2+2+2+2 for 5 days
- **Inj. Omeprazole 40mg (Risek, Ruling)**
  1 vial iv stat and OD **or** oral PPI till taking steroid
- **Tab Levofloxacin 500mg (Leflox)** 1+0+0 **OR**
  Tab Moxifloxacin 400mg (Mofest) 1+0+0

➢ Alternate antibiotic

Tab Co-Amoxiclave 625(Calamox) 1+1+1 **or**
Tab Azithromycin 500mg (Azitma) 1 tab OD

According to Severity you can choose higher antibiotic like Meropenem 1g IV TDS etc.)

If no response then can add:

- **Inj. Aminophylline** 250mg + inf. Dextrose 25% 20ml IV slowly over 20 min stat **then** Inj. Aminophylline 250mg + inf 5% dextrose 500ml IV @ 45 microdrops/min

BIPAP (Non-invasive Ventilation) Indications are

- ❖ Respiratory rate >25/min.
- ❖ Mild to moderate respiratory acidosis (PH <7.35)
- ❖ Hypercarbia paco2 >45 mmHg.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

Definition: Progressive obstructive lung disease mostly associated with Smoking
Important types are is chronic bronchitis and Emphysema (breathlessness)

Chief Complaint:

- Male Smoker above 40 years of age.
- Breathlessness cough, sputum, fever
- Hx of Smoking

O/E: Vitals (pulse, BP, Spo2%, Temp) JACKLET

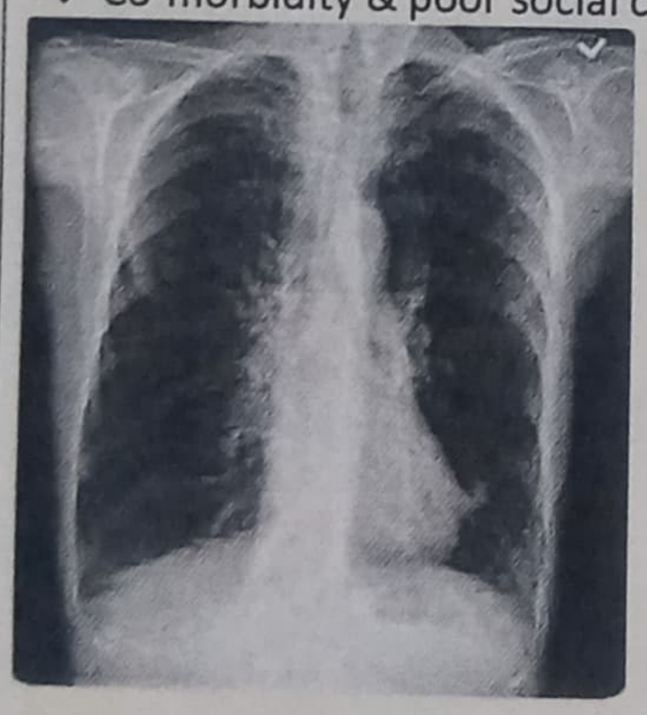
- Chest: Rhonchi+, vesicular breath Sound with prolong expiration

Investigation:

1) **CXR (PA Views);**
   Hyper inflated lung, flattened diaphragm, Bulla
2) **CBC, ESR, CRP, ECG**
3) **Pulmonary function test (PFT)**
   (Obstructive pattern + reduce DLCO)
   FEV: reduce, **FEV1/FVC ratio;** reduce
   DLCO: is reduced in emphysema.
4) **ECG, Echo:** to rule out Cor-Pulmonale
5) **ABG, Sputum analysis**

Indication for Admission in hospital

- ❖ Severe symptoms or acute worsening that fail to respond to outpatient management
- ❖ Cyanosis+, peripheral edema+, Alteration of consciousness
- ❖ Co-morbidity & poor social circumstances



Rx: Date: Time:

- **Maintain ABC** (airway, breathing, Circulation)
- **Stop Smoking , avoid things that induce SOB**
- **Diet; Low Carbohydrate, high protein diet**
- Budesonide+Formoterol **(Cap Combivair 400)**
  1 cap BD to be inhaled with device to be continue
- **Triotropium 18mcg DPI (Tiovair)**
  1 Cap to be inhaled with device BD-To be continue
- **Tab prednisolone 5mg (Deltacortil)**
  2+2+2—(30-40mg for 5 days)
- **Cap Esomeprazole 20mg (Nexum, Ezomol)**
  1+0+0 (till taking prednisolone)
- **Tab Doxofylline 400mg (Ofylin, Doxfree)**
  0+0+1 Continue.
- **LTOT (long term Oxygen therapy)**
  16hour/day at 2-4L/minute to achieve a PaO2 >60 mmHg

Indication of LTOT

1. PaO2 <55 mmHg at rest
2. Pulmonary HTN or nocturnal hypoxia
3. SpO2 ≤ 88% at rest
4. O2 desaturation during a six-minute walk test to < 30% for ≥ 10 seconds & >80% for 5 mins

Antibiotic of choice

- Levofloxacin, co-amoxiclave, Azithromycin

Vaccination

- ❖ **Inj. Pneumococcal vaccine (Prevenar)**
  1 amp IM once in 5 year
- ❖ **Inj. Influenza vaccine 0.5ml (Influvac)**
  1 amp IM – once in 1 year

New Drug: REVEFENACIN
Maintenance tretament of patient with COPD.
Dose: 175 mcg/vial once daily via a nebulizer.

Advice: Take medication on time and regularly

- ✓ If SOB, cough or feeling of chest tightness use salbutamol DPI
- ✓ Must gurgle after use of Salmeterol + fluticasone

BRONCHIECTASIS

Definition: It is a condition where the bronchial tubes of lungs are Permanently damaged and dilated
Bronchiectasis is a result of chronic inflammatory due to inability to clear mucous Secretions.

Chief Complaint:

- Persistence chronic cough, Expectoration with copious foul smelling Sputum increases on change in Posture
- Dyspnea, wheezing , Halitosis
- Hemoptysis (due to rupture of vessels)
- Dry bronchiectasis (SICA); no sputum production may have hemoptysis mainly in upper lobe bronchiectasis (post tuberculosis)

Past Hx; Pulmonary TB, recurrent infections/pneumonias

O/E: Vitals, JACKLET, Clubbing +

Chest examination; Trachea Central

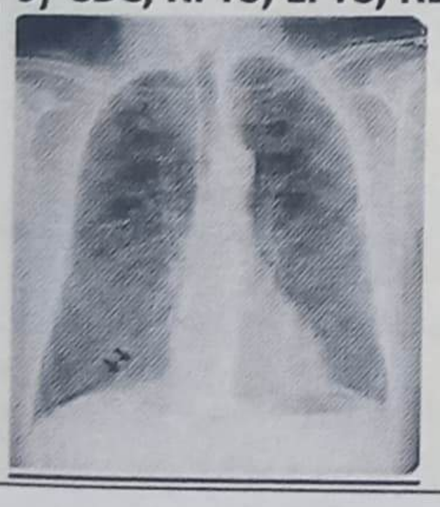
Basal course crepitation on inspiration & expiration

Percussion; Resonant, **Breath Sound;** vesicular

Vocal resonance; normal, **Coarse crepitation:** +

Investigation:

1) **CXR (PA Views):** Tram tracks or ring Shadows (Thickened bronchial wall seen end-on)
Tubular Shadows (bronchi filled with secretions)
2) **HRCT; (Diagnostic & gold standard) Signet ring cells**
3) **PFT:** Obstructive pattern but may be normal
4) **Sputum C/S** (Pseudomonas, Mycobacterium)
5) **Alph-1 antitrypsin level** (if CT Show lower lobe emphysema)
6) **Sweat chloride test** (if suspect cystic fibrosis)
7) **Serum IgE and Aspergillus precipitins**: if patients have eosinophilia, to rule out ABPA
8) **Cilliary function:** Place a Saccharin pellet in anterior Chamber of nose, note the time taken for that to reach the pharynx (taste sensation). It should not exceed 20 mins
9) **CBC, RFTS, LFTS, RBS, S-electrolytes.**



Rx: **Date:** **Time:**

- **Bed rest,** Postural drainage / Chest Physiotherapy Increase Sputum drainage.
- **Acetylcysteine (Mucolator sachet)**
  1 Sachet in glass of water P/O TDS

If Airway obstruction or in all patient

- ❖ Salbutamol 5mg +Ipratropium 500mg Stat and 4-6 hourly and SOS **OR**
- ❖ **Ipratropium bromide (Atem)** nebulization 2 puffs TDS
  Beclamethasone (Clenil) nebulization
  2cc dilute in 5cc NS nebulization TDS
- Inj. Hydrocortisone 250mg (Hydrocortisone)
  1 vial IV Stat and then 100mg IV TDS **OR**
  Tab Prednisone 5mg (Deltacortil)
  2+2+2--5days
- Inj. Omeprazole 40mg (Ruling, Risek)
  1 vial IV Stat and OD
- Inj. Co-amoxiclave 1.2gm (Augmentin)
  IV TDS

If Hypoxemia or Cor-pulmonale

- O2 inhalation stat and SOS
- **Inj. Furosemide 20mg (Lasix)**
  20-60mg IV BD
- **Tab Sildenafil (Viagra) 50-100mg**
  1+0+1

If Hemoptysis not resolved with medical therapy;

Bronchial artery embolization

Vaccination: Pneumococcal and influenza vaccine

- **Inj. pneumococcal vaccine 0.5ml (Prevera)**
  1 amp IM - 5 yearly
- **Inj. Influenza vaccine 0.5ml (Influvac)**
  1 amp IM - 1 yearly

Lung transplant: For Cystic fibrosis

Indication of surgery:(Lobectomy)

- ✓ If bronchiectasis is conformed to single lobe or Segment on CT
- ✓ Young patient
- ✓ Massive hemoptysis

Chest Physiotherapy:

- Patients lie in a position in which the lobe to be drained is uppermost.
- Deep breathing, followed by forced expiratory maneuvers
- Devices that increase airway pressure either by a Constant amount or in an oscillatory manner. Daily

Rx on discharge (Home Medication)

- **Tab Co-amoxiclave 625mg (Augmentin, Calamox)**
  1+1+1 for 7 to 10 days.
- Budesonide + Formoterol **(Cap Combivair 400)**
  1 cap BD to be inhaled with device to be continue
- **Triotropium 18mcg DPI (Tiovair)**
  1 Cap to be inhaled with device OD-To be continue
- **Tab prednisolone 5mg (Deltacortil)**
  2+2+2—(30-40mg for 5 days)
- **Cap Esomeprazole 40mg (Nexum, Ezomol)**
- 1+0+0 for 14 days.
- **Acetylcysteine (Mucolator sachet)**
  1 Sachet in glass of water P/O TDS

Causes of Bronchiectasis:

Congenital	Acquired
• Cystic fibrosis, Cilliary dysfunction • Immotile Cilia Syndrome. • Kartagener's Syndrome • Yellow nail syndrome. • Pulmonary Sequestration.	• Primary TB (upper and middle lobe) • Pneumonias • ABPA (Allergic Broncho pulmonary Aspergelosis) • Immunodeficiency • Post obstructive - foreign body inhalation, obstruction

- **Involves upper lobe:** Cystic fibrosis, ABPA, Tuberculosis
- **Involve middle lobe (Brock's Syndrome):** Complication of Primary TB.
- **Involve upper lobe :** Dry bronchiectasis (SICA)
- **Overall the most common cause for Bronchiectasis is Cystic fibrosis**

Broncho pulmonary sequestration is an uncommon congenital malformation in which a portion of functioning lung early in embryonic life

Best tretament of Bronchiectasis: Antibiotic plus Postural draingage

Sweat chloride test:

Measure the amount of Chloride in sweat, Cystic fibrosis patient have elevated level of Chloride in sweat
Stimulation for the sweating by pilocarpine local injection is given into skin to produce sweat and is collected at least 100mg of sweat is Collected.

Sweat Chloride (inotophoresis)	Sweet Sodium (inotophoresis)
Normal: 5 to 35 mEq/L Marginal: 30 to 70 mEq/L Cystic fibrosis; 70 to 200 mEq/L	Normal; 10 to 40 mEq/L Cystic fibrosis; 70 to 190 mEq/L

PNEMONIA

Definition: Is an inflammation of pulmonary Parenchyma (mostly acute, rarely it can be chronic)

CLASSIFICATION:

Clinically	According to presentation or cause	Anatomical
❖ Community acquired pneumonia ❖ Hospital Acquired Pneumonia (HAP) ❖ Pneumonia in **immunocompromised** (e.g, HIV, Uncontrolled, on anticancer drug)	❖ **Typical Pneumonia:** High grade fever, chills Pleuritic chest pain, tachypnea, Productive cough (e.g strep Pneumonia) ❖ **Atypical Pneumonia:** Low grade fever, Arthralgia, Diarrhea, hemolytic Jaundice (e.g, Legionella, Mycoplasma etc.)	❖ **Lobar pneumonia :** lower lobe: Streptococcus upper lobe: Klebsiella ❖ **Interstitial Pneumonia:** (e.g, mycoplasma, PCP) ❖ **Bronchopneumonia:** (e.g, Staph, viral)

CURB Criteria: (CURB-65 Criteria):

SYMPTOMS	POINTS	Scores can be used as follow:
C: Confusion (Abbreviated mental test score <8/10)	1	**0 or 1 point;** Treat as outpatient (mortality <3%)
U: Uremia (plasma urea > 7mmol/L or > 126mg/dl)	1	
R: Respiratory rate; > 30 beats/min	1	**2 points;** Consider hospitalization (mortality 9%)
B: BP; **Sytolic BP** < 90mmHg & Diastolic BP < 60 mmHg	1	
65: Age ≥ 65	1	**3+ points**; ICU admission (mortality 15 to 40%)

OUT PATIENT TRETAMENT: (CURB-65: 0-1)

1) No comorbidities & no use of antibiotics within previous 3 months:

❖ Tab Amoxicillin 500mg (Amoxil) 1+1+1 **OR** Tab Co-Amoxiclave 625mg (Augmentin) TDS 6 day

❖ **If penicillin allergic then:** Tab Azithromycin (Azitma) 500mg 1+0+0 for 6 days **OR** Tab Clarithromycin (Klaricid, Claritek) 500mg 1+0+1 for 5 days **OR** Cap Doxycycline 100mg (Vibramycin) BD for 5 days

2) Patient with co-morbidities or use of antibiotic within previous 3 months

❖ Tab Moxifloxacin 400mg (Mofest) 1+0+0 for 5-7 days, **OR** Tab Levofloxacin 750mg (Leflox) 1+0+0 for 5 days **OR**

❖ If not improving within 3 days: continue same antibiotic and add Azithromycin or Clarithromycin

❖ 2nd line agent: Ceftriaxone 2gm (inj. Oxidil) OD, Cefodoxime 400mg BD, or Cefuroxime (Zinacef) 500mg BD

❖ If Still not improving admit the patient in hospital

IN PATIENT ADMITTED IN WARD (non-ICU treatment) (CRUB-65 score: 2-3) Any one from 1 **plus** any one from 2

1) Moxifloxacin or Levofloxacin or Ceftriaxone or Ampicillin-Sulbactam
   - ❖ Inf Moxifloxacin (Mofest) 400mg (250ml) IV OD for 5 days **OR**
   - ❖ Inf Levofloxacin (Leflox) 500mg/100ml IV BD for 5 days **OR**
   - ❖ Inj. Ceftriaxone (Oxidil) 2gm IV OD (ATD) for 5 days **OR** Inj. C0-Amoxiclav (Calamox) 1.2gm IV TDS
2) Azithromycin or Clarithromycin
   - ❖ Tab Azithromycin (Azitma, Zygrel) 500mg 1+0+0 for 5 days **OR** Tab Clarithromycin (Klaricid xl) 500mg BD- 5 days

IN PATIENT ADMITTED in ICU: (CRUB-65 score: 4 or 5)

Ceftriaxone or Co-Amoxiclave **PLUS** Azithromycin **OR** Ceftriaxone or Co-Amoxiclave **PLUS** Moxifloxacin, Levofloxacin **OR**

FOR Penicillin allergic patient: Moxifloxacin or Levofloxacin **PLUS** Aztreonam 2 gm IV TDS

Pneumonia in pregnancy: (Admitted to the hospital)

Safe antibiotic are: Ceftriaxone, Co-Amoxiclave, Azithromycin, Cefuroxime

- **Tab Co-Amoxiclave (Augmentin, Calamox) 625mg** 1+1+1 for 5-7 days **OR**
- **Inj. Cefuroxime 750mg (Zinacef) IV BD for 3 days then followed by**
  Tab Cefuroxime 250mg (Zinacef) 1+0+1 for 10-14 days

ATYPICAL PNEUMONIA

Definition: Pneumonia with atypical finding (mild fever, dry cough, alter behavior, Diarrhea, Jaundice hyponatremia etc.)

Mycoplasma pneumonia;

Chief Complaint:

- Flu like symptoms (Headache, myalgia, arthralgia) followed by a dry cough
- Wheeze, fever (typically last > 3 days)
- More Common in age over 3 years
- Hemolytic anemia, Hepatic dysfunction
- Other extra pulmonary Complication (rare)
  Encephalitis, meningitis, GBS, stroke
  Pericarditis, endocarditis, myocarditis, arrhythmias, Thrombotic event
  Kidney: ATN, AIN, glomerulonephritis
  Skin- SJS, erythema multiform nodosum
  Myopathy, arthritis & Rhabdomyolysis

Diagnosis (Investigation):

1) **Diagnosis:** PCR Sputum or Mycoplasma serology
2) **Mycoplasma Serology** (Antibodies against atypical pathogen)
3) **CXR, CBC,ECG**
4) **Cold Agglutinins may cause autoiimune hemolytic anemia**

Rx: Date: Time:

- **Cap Doxycycline 100mg (Vibramycin)**
  1+0+1 - 7-10 days **OR**
  Tab Azithromycin 250mg (Azitma)
  2 tab on day one then
  1+0+0 - 4 days **OR**

Tab Levofloxacin 750mg (Leflox) 1+0+0 - 5 to 7 days

Legionella:

Major risk factors: exposure to contaminated water sources, including Air conditioners, hot tubs & swimming pool and Older age, smoking, immunosuppression

Chief Complaint:

- Flu like symptoms (fever, malaise, myalgia) precede a dry cough and dyspnea
- Fever to 104 °F for first few days
- Cough is late onset, mild, often dry
- Confusion, alter mental Status, Hyponatremia
- Liver involvement: Elevated transaminase

Diagnosis (investigation)

1) **Legionella Urine antigen/ Culture**
2) **Serum electrolyte, LFTs**

Rx: Date: Time:

- **Tab Levofloxacin 750mg (Leflox, Levoxin)**
  1+0+0 **OR**
- **Tab Azithromycin 500mg (Azitma, Zygrel)**
  1+0+0 - 6 days

CHLAMYDIA PNEUMONIAE:

- Upper & lower respiratory tract diseases ranging from mild, nonspecific symptoms to severe pneumonia.
- Causes up to 20% of CAP Pneumonia in adults.

C. pneumonia infection has also been linked to extra pulmonary diseases including atherosclerosis, arthritis, and neurologic conditions

Rx: Date: Time:

- **Tab levofloxacin 750mg (Leflox)**
  1+0+0 **OR**
- **Tab Azithromycin 500mg (Azitma)**
  1+0+0 - 6 days

Community Acquired pneumonia (CAP)

Definition: Pneumonia occurring before or within 48 hours of hospital admission

Chief Complaint:

- Fever with chills and rigors
- Cough; sputum production, Pleuritic chest pain
- Dyspnea, tachypnea and tachycardia
- Streptococcus pneumonia; comment cause
- In chlamydia pneumonia: Fever, Cough, headache, longer duration of symptoms
- Mycoplasma pneumonia: Fever, Cough, hemolytic jaundice, Carditis meningoencephalitis, Erythema nodosum
- Legionella pneumonia:

Headache, Confusion state, Myalgia, Diarrhea, hyponatremia, Elevated Liver enzymes

Streptococcus pneumonia; Commonest Cause

Past HX; DM, COPD, Asthma, HTN, CLD, CKD, TB

Hx of drugs, Surgery (Splenectomy), Alcoholism

O/E: Vitals (BP, pulse, SpoO2%, Temp), JACKLET

- Cyanosis tachypnea and tachycardia
- BP: Hypotension, Chest Sign; Pleural rub +

Chest examination

- Trachea: Central
- Percussion. Dull on affected side
- Breath sound, bronchial on affected side
- Stage of red and grey hepatisation
- Creps; in stage of resolution

Rhonchi; in COPD, and Asthma, **GCS;** confused

Investigation:

1) **CBC with ESR , Serum electrolyte**
2) **CXR PA Views, Sputum/Blood culture**
3) **Blood urea** (for severity)
4) **CRP** (if normal suggest viral pneumonia)
5) Serology for Atypical organism

Rx: Date: Time:

- **Bed rest**
- **Maintain ABC** (Airway, Breathing, Circulation)
- **02 inhalation Stat & SOS** (Maintain spo2% >92%)
- If Severe illness, vomiting, hypotension
  Inf. NS IL + Dextrose 5% IL IV @ 25 drops/min
- **Inj. Paracetamol 1gm/100ml (Provas)**
  (100ml/bottle) 1 bottle IV stat and TDS
- **Inj. Omeprazole 40mg (Ruling, Risek)**
  1 vial IV stat and OD
- **Tab Co-Amoxiclave 625mg (Augmentin)**
  1+1+1 for 14 days
- **Tab Clarithromycin 500mg (Claritek, Klue)**
  1+0+1 for 14 days

➢ Stop anti-hypertensive temporarily

➢ Change antibiotic or on base of culture and sensitivity (C/S) report if necessary.

ICU Admission (Indication of ICU referral):

❖ CURB Score of 4-5
❖ Respiratory rate >30/min
❖ Multilobar pneumonia
❖ Persistent hypoxia (Pao2<8kpa (60mmHg)
❖ Diastolic BP <60mmHg
❖ Confusion, inability to maintain oral intake
❖ Severe acidosis, progressive hypercapnia
❖ BUN > 19.6 mg/dl (7mmol/L)

Treatment failure in pneumonia:

- If CRP doesn't fall by 50%, at day 4 of admission or starting treatment
- Some patient require Nebulization

Atem + Clenil Nebulization TDS

Follow up. After one month (or 6 weeks).

Discharge Criteria for CAP):

- Patient is clinically stable
- Not > 1 clinical signs of

1) Temp >37.8 °C **2)** HR > 100/min
3) RR >30/min **4)** Sao2<90%.
5) Systolic BP < 90 mmHg **6)** Confusion
7) Inability to maintain oral intake

Rx on discharge (Home Medication):

1) **Tab Co-Amoxiclave (Augmentin)** 625mg 1+1+1 for 14 days **OR**
   Tab Cefuroxime 500mg (Zinacef) 1+0+1 for 14 days.
2) **Tab Clarithromycin 500mg (Claritek, Klue)** 1+0+1 for 14 day
3) **Tab Paracetamol 500mg (Panadol, Calpol)** 1+1+1 (if fever and pain)
4) **Cap Esomeprazole 40mg (Nexum, Ezomol)** 1+0+0 for 14 days

Antibiotic on base of CURB-65 Scores:

1. 0 to 1 Point (score):
   Cap Amoxicillin 500mg (Amoxil) 1+1+1 for 5-7 days
2. 2 point (or score):
   Cap Amoxicillin 500mg (Amoxil) 1+1+1 Plus
   Tab Clarithromycin 500mg (Claritek, Klue) 1+0+1
3. > 3 Severe CAP

- Inj. Co-Amoxiclave (Augmentin) 1.2gm IV Stat and TDS
- Inj. Ceftriaxone 2 gm (Oxidil, Rocephin)
  1 vial IV Stat and BD
- Inj. Cefuroxime 1.5gm (Zinacef) IV Stat & TDS PLUS
  - Inj. Clarithromycin 500mg 1 vial IV BD OR Inj. Erythromycin 500mg + Dextrose 5% 100ml IV slowly (6th hourly)

Can change antibiotic on based of culture and sensitivity (C/S) report

ASPIRATION PNEUMONIA

Definition: Aspiration of gastric Acid Produces chemical pneumonia Characterized By acute dyspnea, wheezing with hypoxemia and infiltrates on CXR in one or both lower lobes

Chief Complaint:

- Fever (High grade)
- Cough
- Acute dyspnea
- wheezing

Past Hx: Diabetes mellitus, unconscious, Stroke, bed ridden Surgery under General anesthesia, aspiration of vomit, fits (epileptic patient)

On Examination:

- Vitals (BP, pulse, Spo2%, Temp)
- JACKLET
- Chest examination
  - Trachea; Central
  - Percussion: dull on affected Side
  - Breath Sound: wheeze bronchial breath on affected Side
  - Wheeze, and crypts +

Investigation:

1) CXR PA View
2) RBS, Serum electrolyte
3) CBC

Rx: Date: Time:

- **Maintain ABC** (airway, breathing, Circulation)
- Propped up Position
- Suction; if needed
- **O2 inhalation** Stat and SOS; if SpO2% < 90%
- Pass IV line
- **Inj. Co-amoxiclave 1.2gm (Augmentin)**
  1 vial IV Stat and TDS
- **Inj. Omeprazole 40mg (Ruling, Risek)**
  1 vial IV Stat and OD
- **Inj. NS 500 ml** IV BD
- **Inj. Metoclopramide 10mg (Metomide)**
  1 vial IV Stat and TDS
- **Inf. Metronidazole 500mg /100ml (Flagyl)**
  1 bottle IV Stat and TDS
- **Inj. Paracetamol 1gm/100ml (Provas)**
  1 bottle IV Stat and SOS (in case of Fever)
- **Inj. Dexamethasone (Decadron)** IV Stat and OD

Rx on discharge

- **Tab Co-amoxiclave 625mg (Augmentin)**
  1+1+1 for 7 day
- **Tab Metoclopramide 10 mg (Metomide)**
  1+1 before meal for 10 days
- **Cap Esomeprazole 40mg (Nexum, Ezomol)**
  1+0+0 for 14 days.
- Any Cough Syrup (if cough present)
  Syrup Cosome E 2tsf TDS **OR**
  Syrup Hydralline 2 tsf TDS
- **Tab Paracetamol 500mg (Panadol, Calpol)**
  1+1+1 (in case of fever).

PNEUMOTHORAX

Definition: Pneumothorax is air in the pleural space causing partial or complete lung collapse. A Significant pneumothorax can cause shift of mediastinum & compromise hemodynamic Stability.

Chief Complaint:

- Anxiety, dyspnea
- Sudden onset of unilateral Pleuritic Chest Pain, Respiratory distress.

Past HX: COPD, Asthma, TB and Trauma

On Examination:

- Vital (BP, pulse, Spo2%, RR), JACKLET
- Tachypnea, bradypnea (as preterminal event) Cyanosis
- Tachycardia, hypotension, Pulsus paradoxus.

Chest examination:

- Inspection: Hyper-expansion of chest wall
- Restricted Chest movement on affected Side
- Trachea; Tracheal deviation to opposite site
- Percussions: Resonant on affected side
- Breath sound: unilateral decrease or absent
- Crypts and Rhonchi

Investigation:

1) **Chest x-rays;** increase translucency.
   Ipsitateral lung edge seen parallel to chest wall, and "deep sulcus Sign" (deep costopherenic angle)
2) **Motion mode ultrasound:** Sand-on-Beach and barcode (Stratosphere) Sign
   Lack of lung sliding
3) **RBS, Serum Electrolyte LFTS, RFTS, CBC , ABG**

Criteria for stable patient with pneumothorax:

- ✓ Respiratory Rate < 24 breaths / min.
- ✓ No dyspnea at rest, speaks in full Sentences
- ✓ Pulse >60 and <120 beats/min
- ✓ BP: normal, Spo2% > 90% on room air
- ✓ Absence of Hemothorax

Differential diagnosis (DDS):

- Acute MI
- Pulmonary embolism
- Pneumonia

Rx: Date: Time:

- **High flow oxygen** stat and SOS

Asymptomatic (no breathlessness) or if the lung is 20% Collapse and if lung edge is < 2cm away from Chest wall: then

- Monitor for 6 hours and watch the progress by a series of CXRS until air is completely absorbed or lung Completely re-expands
- Treat with high flow oxygen

Young patient with primary spontaneous pneumothorax moderate or large in Size

- Percutaneous needle aspiration.

Secondary pneumothorax

- Chest tube insertion

Tension pneumothorax (~Symptomatic)

- Urgent needle decompression followed by chest tube placement

TX after insertion of IT tube:

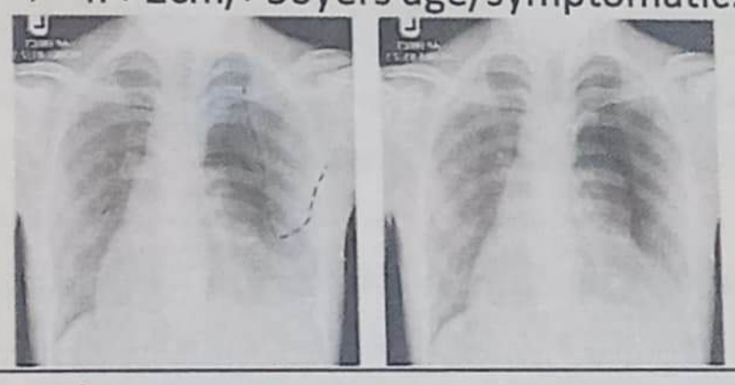
- **Inj. Omeprazole 40mg (Nexum, Ezomol)** 1 vial IV Stat and on
- **Inj. Ketorolac 30mg (Toradol)** 1 amp IV Stat and TDS
- **Inj. Meropenem 1gm** IV Stat & TDS

Primary Pneumothroax:

- ➢ If <2cm & asymptomatic : Discharge & follow up X-rays after 2 weeks
- ➢ If <2cm & Symptomaic: Aspiration.. if fail then chest tube

Secondary Pneumothroax:

- ➢ All patients should be admitted for atleast 24 hours
- ➢ If <1cm: High flow oxygen, observe for 24 hours
- ➢ If 1 to 2 cm: Aspiration
- ➢ If >2cm/>50yers age/symptomatic: Chest tube



Observation and management of patient with chest tube:

- Observe if bubbling present or not. If bubbling ceased; Perform CXR PA View 24 hours later.
- If lung is fully expanded; Remove tube
- If bubbling persist after 5-7 days' (Indication for surgery (call surgery for thoracotomy)
- If bubbling has ceased before being fully inflated; check the tube for any obstruction or displacement.

LUNG ABCESS

Definition: Necrosis and cavitation of lung tissue following the microbial infection.

Chief Complaint:

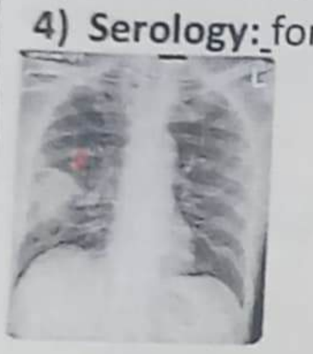
- High grade fever, Chest Pain, breathlessness
- Cough: Productive, foul smelling sputum
- Night sweat, fatigue, anemia, Hemoptysis

O/E: Vitals, Gingival disease, digital clubbing,

- Absent gag reflex can be seen
- Chest: Restricted chest movement on affected site

Investigation:

1) CXR: thicked wall cavity
   single cavity > 2cm or multiple cavities
2) **CBC, RBS**
3) **Culture and sensitivity;** of pus drained
4) **Serology:** for opportunistic pathogens



Rx: Date: Time:

- Bed rest
- **Postural drainage + culture sensitivity**
- **Inj. Clindamycin 600mg** (Dalacin-C) IV TDS till clinical improvement then followed by Tab Clindamycin 300mg 1+1+1+1 **OR**
- **Inj. Meropenem 500mg** -1 gm IV TDS **OR**
- **Inj. Ampicillin + Cloxacillin (Amplus)** 500-1000mg IV TDS **Plus** Inf. Metronidazole 500mg/100ml (Falgyl) IV Stat and TDS then orally 4-6 weeks
- **Inj. Paracetamol 1000mg/100ml (Provas)** 1 bottle stat and SOS (for fever & pain)

Change antibiotics according to C/S report
Switch to oral antibiotic from IV after clinical improvement and continue TX for 4-6 weeks

Surgical resection & Percutaneous drainage

❖ NO response to antibiotic (10-20% patient)
❖ Abscess more than 6-8 cm

PLEURAL EFFUSION

Chief Complaint: Pleuritic chest pain, chest pressure, dyspnea and Cough are most common symptoms.

- Dyspnea Complaint only in massive effusion
- Pleuritic chest pain decrease after development of Significant amount of fluid
- Detectable Sign with Fluid > 500ml

Past Hx: Pneumonia, TB, Carcinoma, exposure to asbestosis and nephrotic syndrome

O/E: Vitals, Chest examination

➢ Decrease Chest movement on affected side
➢ Dullness to percussion over fluid.
➢ Diminished breath Sound on affected side.
➢ Decrease vocal fremitus and resonance
➢ Percussion - Stony dullness over chest wall.

Investigation:

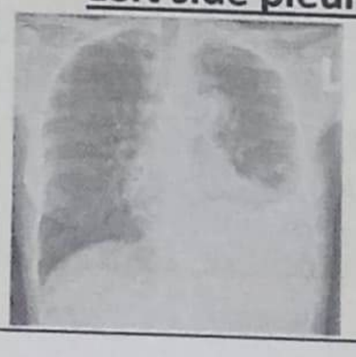
1) **CXR; in Lateral decubitus position** (with Patient lying on their side) are more Sensitive in small effusion and can pick up as little as 50ml of fluid.
2) **X-ray Chest PA/AP!** At least 300ml of fluid must be present before upright Chest films. Can pick up Signs of pleural effusion (e.g blunted Costopherenic angle)
3) **RBS, CBC, LFTS, RFTS, Serum electrolyte**
4) **Pleural effusion aspiration** (Thoracentesis)

Rx: Date: Time:

❖ Treatment of pleural effusion depends on the underlying cause of the pleural effusion.
  ➢ If Symptomatic: Therapeutic pleural drainage
  ➢ Therapeutic aspiration may be sufficient in most cases; larger effusions may require insertion of an intercostal drain (either pigtail or surgical).
❖ The chest drain is usually located in the 5th or 6th intercostal space along the posterior axillary line for dependent drainage. The conventional site for aspiration is posteriorly, and 1-2 intercostal spaces below the upper level of the fluid.
❖ All intercostal drains inserted for pleural effusions should be real time ultrasound guided
❖ Antibiotic plus painkiller

✓**SOB+ Pleural effusion=** Diagnostic + therapeutic Tap
✓**Pleural effusion only=** Diagnostic Tap

Left side pleural effusion:



Pleural effusion aspiration (Thoracentesis): Fluid may be evaluated for

- Protein, LDH, Albumin, amylase and glucose
- Gram stain and culture to identify bacterial infections
- Cell count, differential count, cytology to identify cancer cells.
- Adenosine deaminase (ADA), TB, PCR, Lipid culture

Side of effusion	Causes
Right Side	Ascites, Thoracic duct obstruction below TS, Meig's Syndrome
Left side	Pericarditis, Thoracic duct obstruction Above TS, pancreatitis, esophageal rupture, Dressler's Syndrome ·
Any side	Hypothyroidism, infection bacterial, Viral, TB, Malignancy.
B/L with or without ascites or Pericardial effusion Pedal edema	Cardiac failure (CCF), Connective tissue disease, liver cirrhosis Hypoproteinemia, anemia

Transudative and exudative: Distinguished by measuring LDL and protein level in pleural fluid

- Exudative pleural effusion meet at least on the following Criteria (Light's Criteria) whereas transudative pleural effusions meet none;

i) Pleural fluid protein / Serum protein >0.5, ii) Pleural fluid LDL/ serum LDL >0.6,
iii) Pleural fluid LDH > or Two thirds normal upper limit for serum LDH

Features	Exudate	Transudate
On standing	Clots, web formation	Does not clot
Pleural fluid protein	>3.0 gm/dL	<3.0 gm/dL
Pleural fluid Protein: Serum Protein	> 0.5	< 0.5
Serum vs. pleural fluid albumin	>1.2 mg/dL	<1.2 mg/dL
Pleural fluid glucose	<60 mg/dl	>60 mg/dl
Pleural fluid LDH	>200 IU/L Pleural fluid LDH more than two thirds normal upper limit for serum	<200 IU/L Pleural fluid LDH < 2/3 normal upper limit for serum
Pleural fluid LDH: Serum LDH	>0.6	< 0.6

Test	Test Value	Diagnosis
Adenosine deaminase (ADA)	40 U/L	Tuberculosis (TB) >90%, Empyema (60%), Parapneumonic Effusion, Malignancy, Rheumatoid arthritis (RA) (5%)
Cytology	Malignant cells	Malignancy
Glucose	< 60mg/dL	Complicated Parapneumonic effusion or empyema (bacterial), TB (20 %), Malignancy (<10%), RA (5%).
LDH	>2/3 OF Upper limit normal FOR SERUM LDH	Any condition causing an exudate
Fluid LDH : serum LDH ratio	>06	Any condition causing an exudate
Fluid protein: serum protein	0.5	Any condition causing an exudate
Red blood cell count	>100,000 /mm^3	Malignancy, trauma, Parapneumonic effusion, PE, TB
Fluid Hct to blood Hct ratio	>0.5	Hemothorax
WBC count and differential	>10,000 /mm^3	Empyema.
Neutrophils	>50%	Parapneumonic effusion, Pulmonary embolism.
Lymphocytes	>50%	Tuberculosis, Malignancy

SARCOIDOSIS

Definition: A Chronic multi-system disorder of unknown cause characterized by accumulation of T-lymphocyte and mononuclear phagocyte, non-caseating granulomas

Chief Complaint:

1. **90% cases lung is affected as ILD;**
   Cough, breathlessness, fever, night sweat, malaise and Pulmonary arterial hypertension may be present
2. **Skin (10%-30%)**
- Erythema Nodosum on Anterior surface of legs.
- Skin plaques : face, buttocks, extremities
- Maculopapular eruption-around eye, nose, back and extremities
- Lupus Pernio, Blue-purple, swollen, shiny Lesion on nose, cheeks, lips, ears, finger, knees
- Subcutaneous nodules (Darier-Rousey Lesions) over trunk and extremities

3. **Eye (25%):** Anterior / Posterior uveitis
   Kerato-conjunctivitis Sicca (dry, sore eyes)
4. **Nose;** Nasal Stiffness
5. **Bones;** Arthritis, punch out lesions.
6. **Heart;** cardiac arrhythmias, heart block, sudden death,
   Endocrine: Diabetes insipidus
7. **CNS:** Mononeuritis multiplex, peripheral neuropathy, facial nerve palsy

Lofgerns syndrome: Fever, erythema nodosum, B/L hilar lymphadenopathy, arthralgias

Heerfordt-waldenstrom syndrome: Fever, Parotid enlargement, anterior uveitis, facial nerve palsy

O/E: Vitals, Nodes: B/L hilar lymphadenopathy Hepatosplenomegaly, skin, systemic examination

Investigation:

1) **ACE level** (Elevated): Disease severity
2) **Hypercalcemia;** Hypercalciuria, Renal Stones
3) **Elevated 24 hour urine ca^{++}, Serum Calcium**; Elevated
4) **BAL** (Broncho alveolar lavage)
5) **Tissue biopsy/transbronchial biopsy: DIAGNOSTIC**

CXR:

Stage 1: B/L hilar Symmetrical adenopathy (BHL)
Stage 2: BHL+ parenchymal infiltrate + Reticular opacities
Stage 3: Parenchymal infiltrate or shrinking hilar lymph node
Stage 4: Pulmonary fibrosis + calcification and Cavity or cyst formation may be present.

Rx: Date: Time:

- **For Acute dissase:** Bed rest, NSAIDS

Steroid (glucocorticoids) main stay of treatment

- **Tab Prednisolone 5mg (Deltacortil)**
  (1mg/kg/day) 3+0+3- 12 weeks
  (20-40 mg/day) Then
  Tab Prednisolone 5mg (Deltacortil)
  3+0+2 for 1 week Then
  2+0+2 for 1 week Then
  2+0+1 for 1 week Then
  2+0+0 for 1 week Then
  Maintains Treatment at 5-10 mg/day
- As **inhaler Budesonide** 800 to 1600mcg BD
- **Tab Omeprazole 20mg (Zolbi, Risek)**
  1+0+0 before meal (till taking steroids)

Other management:

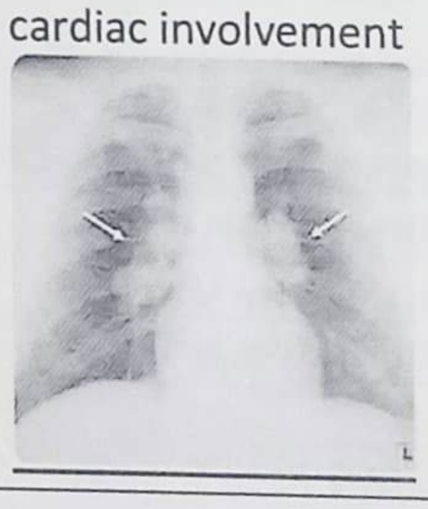
Inj. Cyclophosphamide 1gm (Endoxan)
500mg-1200mg every 3-4 weeks IV pulse **OR**
Tab Cyclophosphamide (Endoxan) 50-150mg OD
If pulmonary fibrosis (Advanced): Lung transplantation

Alternatives (if steroids doesn't work)

1. **Tab Methotrexate (Cytothrexate)** 10mg once weekly **plus** Tab Folic acid 5mg 1 tab daily except on day taking methotrexate
2. **Tab Leflonamide (Cara)** 10-20/daily
3. **Hydroxychloroquine (HCQ)**200 OD or BD
4. **TNF inhibitors:** Thalidomide for refractory Sarcoidosis for cutaneous disease

INDICATION OF STERIODS:

Parenchymal lung disease (symptomatic, static or progressive), Uveitis, Hypercalcemia, neurological or cardiac involvement



Pulmonary Tuberculosis

- Through inhalation bacilli reaches lung parenchyma (Ghon's Lesion).
- Lymphadenitis caused by Lymphatic dissemination of Koch bacillus into hilar lymph nodes.
- Primary Lesion together with these nodes is known as Ghon's Complex (Primary Complex)
- Classical TB lesion is a Granuloma with Central Caseation
- The caseous necrosis can produce post primary infection cavities or calcification (Ranke Complex)

Chief Complaint:

- Low grade fever: mainly evening rise of temp
- Night Sweat, Anorexia, weight loss, weakness
- Chronic Cough, Hemoptysis, pallor, Cachexia

Past Hx; Contact with TB patient, any drug history

O/E: Vitals, JACKLET

- Sign of Consolidation or Cavitatory lesion
- Sign of Apical fibrosis & pleural effusion
- Scalene or supra clavicular/cervical lymphadenopathy
- **Chest:** Dull on percussion, Vocal resonance increase

Investigations

1) **CXR** (PA View); Patchy opacity or Cavitatory lesion
2) **Sputum AFB** (Ziehl Nelson staining) 2 Sample
3) **CBC with ESR & Mantoux test**

WHO definitions

A) Smear - Positive Cases;

- At least two positive smears, or
- Only 1 postitive Smear & radiographic abnormalities Compatible with pulmonary TB, or
- One Positive smear & one positive culture.

B) Smear-negative cases

- Atleast 3 negative smear & ≥ 1 positive culture, or

Atleast 2 series of negative smears from samples taken at least 2 weeks apart, with persisting radiographic abnormalities Compatible with active TB, not improved with treatment using broad spectrum antibiotics for at least 1 week

Treatment duration:

Intensive phase: 2 month

Continuoous phase: 4 month

Rx: **Date:** **Time:**

- **Tab Myrin P Forte (4HRZE)**
  3+0+0 For 2 months
- **Tab Pyridoxine 25mg (vita 6)**
  0+1+0 For 6 months
- **Tab Paracetamol 500mg (Panadol)**
  1+1+1 (in case of fever)

After 2 months:

Tab Myrin P 2HR 3+0+0 for 4 months

Follow up!

- ✓At the end of 2nd month
- ✓Start of 5th month
- ✓At the end of treatment
- ✓Labs; Sputum AFB, Smear, CBC, SGPT, RFTs

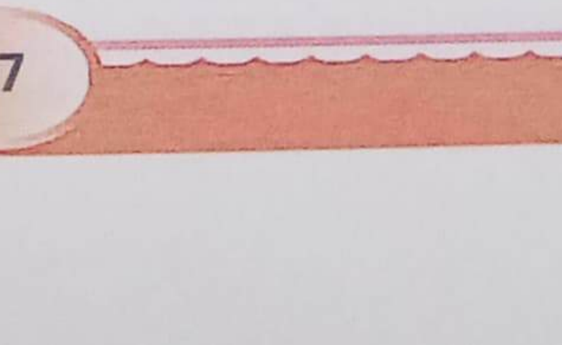
Weight in kg	Number of HRZE OT HR tablet to be taken daily
30-37	2
38-54	3
55-70	4
> 70	5

- **Intensive phase:** for 2-month which consist of HRZE

(**H:** Isoniazid **R:** Rifampicin, **E:** Ethambutol, **Z:** Pyrazinamide

- **Continuous phases;** for 2 months (HR)
  H: Isoniazid, **R:** Rifampicin

Primary TB at left apex



WHO TB category	Patients
I	New Smear Positive P.TB (pulmonary TB) New smear negative P.TB (pulmonary TB) and extra pulmonary TB
II	Relapse, treatment failure, treatment after interruption

Categorization of TB treatment:

TB diagnosis category	TB cases	Treatment
CAT-1	➢ New smear positive PTB ➢ New smear negative PTB ➢ New extra pulmonary PTB ➢ New concomitant/ associated HIV/AIDS	➢ 4HRZE for 2 months Then 2 HR for 2 months
Re-Treatment	➢ Sputum smear PTB with H/O treatment of 1 month or more ➢ Relapse ➢ Treatment failure after cat-1 ➢ Treatment after loss to follow up	➢ If rifampicin sensitive after gene expert ➢ Pulmonary positive or extra pulmonary TB 6 (HRZE + Levofloxacin) ➢ Pulmonary negative : 6 (HRZE) ➢ TB meningitis, bone TB, neurological TB 12 (HRZE + Levofloxacin) If Rifampicin, resistance after gene export TX Like MDR TB

Anti-Tubercular Treatment- ATT:

Drug	Dose	Side effect (SE)	Management of SE
INH (Isoniazid)	5mg/kg (Max 300mg)	Hepatitis, Peripheral Neuropathy	Vitamin B6 (Tab Vita-6)
Rifampicin	10mg/kg (Max 600mg)	Orange-red colour body secretion (urine, tear) & Hepatitis	Reassurance
Ethambutol	15mg/kg	optic neuritis	Stop & never use it again
Streptomycin	15mg/kg	Deafness,(vertigo & Nystagmus) Nephrotoxicity	Stop & never use it again
Pyrazinamide	25mg/kg	Hepatitis Hyperuricemia (gout)	NSAID for Joint pain
All TB drugs		itching + minor skin rash	Exclude skin disease. Give Tab fexofenadine (Fexet) 120 my OD
		Itching+ moderator to severe skin rash	Step Anti-TB drugs Need expert opinion
		Vomiting & confusion (suspect Hepatitis)	Stop anti-TB drug until Jaundice resolve Need export opinion
Rifampicin		Shock Syndrome, Purpura, H. anemia, renal impairment	Stop Rifampicin and never use again

Levofloxacin: (< 33kg; 7.5-10mg/kg) (33-50kg; 750mg) (>70kg; 1000mg)

Children < 5years; 15-20mg/kg >5years; 10mg/kg

Mantoux Test: Intradermal injection of tuberculin solution 0.1 ml (10 Tuberculin units) at Junction of mid & upper third of dorsal surface of left forearm Read after 48 to 72 hours.

- Measure the diameter of induration across the transverse axis of the arm
  - Positive- 10mm (In HIV 5mm is +ive)
- **False Positive:** BCG vaccinated, Exposure of Non-Tuberculosis Mycobacteria, Past H/O TB
- **False Negative;** Severe TB, Newborns and Elderly Milliary TB, AIDS, Malnutrition, On Immunosuppressive drugs, Malignancy, Sarcoidosis, Recent infection
  - Manteaux positive shows the person is infected with M. tuberculosis, but it does not tells that the person is suffering from tuberculosis

Important to Note:

If Rifampicin cannot be given due to any reason, then total ATT duration should be 18 months

1) Drug induce hepatitis: Caused by Isoniazid, rifampicin and defined as five times the upper Limit of normal Serum AST in asymptomatic patient or three times the upper limit of normal in symptomatic patient. When AST level exceed these limits, medications likely to cause hepatitis should be discontinuing. in patients with elevated AST capreomycin, fluroquinolones (e.g levofloxacin), or two or more drug unlikely to cause hepatitis's (e.g., Ethambutol, Streptomycin, Amikacin, kanamycin) may be used until liver enzyme normalized

   Rx. Stop Anti-TB drugs and If hepatitis resolve; continuation phase of 6(HR)

- If hepatitis isn't resolved completely; 12 (Streptomycin + Ethambutol)

2) CLD patient are having increased risk for drug induce hepatitis **Rx** 2 (SHRE) + 6 (HR)
3) If patient develop Jaundice: Stop Anti-TB drugs, advice LFTS, Anti-HCV, anti-HEV, anti-HCV (viral markers), USG, Hepatobiliary system; if viral markers are negative then its drug induce hepatitis Rx; withhold drug until jaundice and hepatic symptoms are resolved and LFTS are returned to normal. And recommended Anti-TB drugs are (PEIR)
4) Pregnancy: TX with HRZE but avoid Streptomycin it cause congenital deafness
5) Breast feeding is not contraindicated during treatment for tuberculosis
6) DOTS (directly observed treatment Short Course)

   It means that health care worker or other designated individual (not a family member) provides the prescribed TB drug and watches that patient Swallow every dose.

7) In Renal failure; 2(HR) + 4(HR)
8) The risk for TX failure or relapse is greatest in patients who present with Cavitation on initial chest radiograph's & have positive Sputum culture after the initial tretament phase. These patients should receive a minimum of 31 weeks of therapy after the initial 8-week initiation phase.

Multi Drug Resistance TB (MDR TB)

TB Which is Resistance to Rifampicin and Isoniazid (reisirance to H+R) Called MDR TB

- ❖ Treatment without a sensitivity report - Second line drugs can be used
- ❖ Start at least 3 drugs never used: Kanamycin, Ethionamide, Ofloxacin and pyrazinamide
- ❖ Aminoglycoside, Quinolones Ethionamide, Pyrazinamide, for 3 months. Quinidine's and Ethionamide for 18 months
- ❖ If culture show resistance to isoniazid but rifampicin still active: use rifampicin and Ethambutol until the end of nine months

Combination of 4 drug For MDR TB			
Aminoglycoside (15-25 mg/kg) Streptomycin Amikacin 0.75 gm Kanamycin 0.75 gm Capreomycin 0.75 gm	Quinolones Ofloxacin 400 mg BD Ciprofloxacin 750 mg BD Sparfloxacin 400 mg BD Moxifloxacin 400 mg OD	Ethionamide 250 mg BD Prothionamide 250 mg BD	Pyrazinamide25 mg/kg
Other drugs in second line: Cycloserine 10-20 mg/kg p-aminosalicylic acid (PAS) 10-12 g			

- ➢ Surgical resection: Surgery is recommended for patients with MDR-TB whose prognosis with medical tx is poor
- ➢ Pregnant women with active TB should be treated, even in the first stage of pregnancy, Isoniazid, rifampin, and Ethambutol, pyrazinamide is commonly used in pregnant women with TB. Streptomycin should not be used. Because it has been shown to have harmful effects on the fetus.

Extensively drug-resistant tuberculosis (XDR-TB): XDR-TB is defined as TB that has developed resistance to at least Rifampicin and Isoniazid as well as to any member of the quinolone family and at least one of the following second-line anti-TB injectable drugs: kanamycin, capreomycin, or Amikacin.

PULMONARY EMBOLISM (PE)

Definition: An obstruction of the pulmonary arteries or one of its branches by material like thrombus, tumor, air, or fat that originate elsewhere in the body .Emboli originate from venous thrombi (DVT) in leg (or rarely paradoxically through a Patent Foramen Ovale or Atrial Septal Defect)

Chief Complaint:

- Acute: C/F immediately after obstruction of pulmonary vessels
- Subacute: C/F within days or weeks
- Chronic: Slowly develop symptoms of pulmonary HTN over many years

Remember 'SAD CLOTS"

S: Sudden chest pain (Pleuritic Pain)
A: Acute breathlessness
D: DVT or PE history,
C: Cough with Hemoptysis
L: Leg Swelling, Pain, **O:** O2 Saturation <95%
T: Tachycardia (HR >100 b/m), **S:** Syncope
Also, low grade fever
Past Hx: DVT, surgery, bed ridden, Oral contraceptive pill, malignancy, Prolong travel

O/E: Vitals (pulse, BP,SPO_2%, Temp) JACKLET

- Tachypnea, hypoxia, Cyanosis, tachycardia
- Hypotension (due to RV failure), Loud P2
- Elevated JVP, Acute cor-pulmonale
- low grade fever, spo2%:< 95% on room air

Investigation

1) **D-dimer:** (ELISA)-Elevated >500 ng/mL
Can also be + in; MI, pneumonia, Sepsis
A low d-dimer rule out Pulmonary embolism
A false negative D-dimer seen in patient on anti-coagulant Therapy
2) **CT pulmonary Angiography (CT-PA) (first line & Gold standard investigation)**
3) **ABG:** Both PO2 and PCO2 are reduce
4) **ECG:** Sinus tachycardia (MC findings)
New onset AF, RBBB, RVH,
SI, Q3, T3, (Classical finding but not Common)
   - S1; S wave in lead I
   - Q3; Q wave in lead II
   - T3; Inverted T Wave in lead III
5) **V/Q scan:** Useful in patient with severe renal failure, dye allergy, pregnancy, young age
6) **X-Ray Chest:** westermark's, Hampton's sign
7) **Echo**

Rx: Date: Time:

- **Maintain ABC;** Airway, breathing, Circulation
- **O2 inhalation** and continues

Acute PE with Hemodynamic instability

- 02 inhalation & ventilator support
- **If shock:** cardiogenic, then dobutamine

Dobutamine: 5-20 mg/kg/min, Norphine: 0.5- 5mg/kg/min
Inf NS IV @ 30 drops/min

Systemic thrombolysis

a) Streptokinase 250,000 IU as loading dose over 30 mins followed by 100,000 IU/hour over 12-24 hours [after ruling out Contraindication for Streptokinase (SK)]
b) If SK not available, then anticoagulation with unfractionated heparin is used, 80 units/kg IV infusion bolus then IV continuous infusion of 18 units/Kg/hour with aPTT monitoring
c) Surgical embolectomy or percutaneous Cather direct treatment if thrombolysis contraindicated or fail

- Failed thrombolysis: Persistence clinical instability and unchanged Right Ventricular dysfunction on Echo after 36 hours

Acute PE with Hemodynamic stability

- **Inj. Enoxaparin 60mg (Clexane)**
S/C stat and BD-5 days (1.5mg/kg) **OR**
- **Inj. Fondaparinux (Arixtra)**

5mg S/C - OD (if <50kg weight). 7.5mg S/C - OD (if ≥ 50 kg weight)
Then Switch to NOACS [NOACS preferred over VKA (warfarin)]
a) NOAC (non vit K oral anticoagulants)
Tab Rivaroxaban (Rivaro, Xcept, Xarelto) 15mg
1+0+1 - 21 days (15mg BD for 21 days) then
Tab Rivaroxaban (Rivaro, Xcept) 10mg 1+0+1 – conti (20mg OD)
b) If NOAC not recommended i.e., Renal Failure, Pregnancy, lactation, patient with APLS then vit K antagonist
Note: All Patient with PE should receive anticoagulation treatment of > 3 months

Duration of Therapy:

- First episode of Venous thromboembolism (VTE) due to reversible rsik factors (e.g, Surgery, major trauma: 3 months
- If Venous thromboembolism (VTE) is unprovoked i.e, idiopathic or risk factors are weeks: 6 months
- Persistance prothrombotic risk or a history of previous emboli (second episode): lifelong treatment

Wells criteria and modified Wells (clinical assessment for PE)

Clinical symptoms of DVT (leg swelling, pain with palpation)	3
Other diagnosis less likely than pulmonary embolism	3
Hear rate >100	1.5
Immobilization (>3days) or surgery in the previous 4 weeks	1.5
Previous DVT/PE	1.5
Hemoptysis	1
Malignancy	1
Probability	Score
Traditional clinical probability assessment (wells criteria)	
High	> 6
Moderate	2 to 6
Low	< 2

Simplified clinical probability assessment (Modified wells criteria);

- **PE Likely: Score > 4 PE unlikely: Score <4**

PE rule out criteria (PERC)

1) PERC Includes 8 factors

1) age < 50 years 2) pulse rate <100 beats/minute 3) Oxygen saturation (SpO2) > 94% 4) no unilateral leg swelling 5) no hemoptysis 6) No surgery or trauma within 4 weeks 7) no previous DVT or PE 8) No OCP use

Patient fulfilling all & criteria considered negative for PE (Pretest probability < 1%)

For Causes of thrombosis remember "THROMBOSIS"

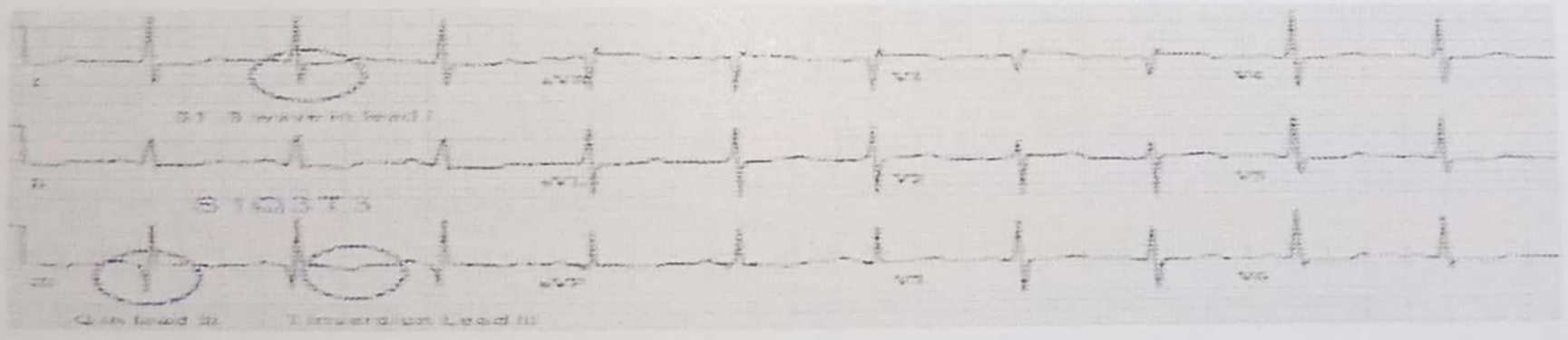
Travel - Long journey, **H**ormone therapy; OCPs, **R**oad traffic accidents, **O**perations-post operation period, **M**alignancy, **B**lood disorders; Polycythemia, APLA, **O**ld age, **O**besity, **S**moking, **I**nherited disorders; Deficiency of Factor V, Antithrombin III, Protein C, protein S, **S**plenectomy - leads to thrombocytosis

Imaging:

- V/Q scanning: Normal V/Q scan rules out Pulmonary embolism
- CT chest with contrast, MDCT
- Colour Doppler of leg veins to rule out DVT
- CT Pulmonary Angiography (CTPA): Most specific; it can detect emboli as small as 1-2 mm

CXR:

1. **Pala Sign**: enlarge right descending Pulmonary artery
2. **Fleischner Sign:** Dilated Pulmonary artery
3. **Fleischner lines:** long curvilinear densities reaching Pleural surface
4. **Felson Sign:** Pleural effusion in left > right
5. **Westermark's sign:** oligaemia of lung fields
6. **Hampton's sign:** wedge shaped pulmonary opacities above diaphragm



Gastroenterology

GERD (Gastro-esophageal reflux disease)

Definition: Regurgitation of gastro-duodenal contents into the esophagus.
Causes: Obesity, pregnancy, Smoking, Alcohol, Systemic sclerosis, hiatus hernia, Food (chocolate, Coffee, large meal, fatty food). and drugs (Anti-cholinergic, nitrates, Calcium channel blocker)

Chief Complaint:

- Heart burn (Burning retrosternal or epigastria pain)
- Occur 30-to 60 min after meal
- Worse on bending, Stooping or lying and with hot drinks
- Pain relieved with taking Antacids & baking soda
- When this symptom is dominant, the diagnosis is established with high degree of reliability.

Other Symptoms:

(Atypical or extra esophageal)

- Asthma, chronic Cough, Chronic laryngitis, sore throat, Sleep disturbance, nausea & vomiting, Dysphagia in 1/3 Patient

Investigation:

1) **Urea breath test, or stool antigen test**
2) **24 hours esophageal PH monitoring**
3) **Upper GI Endoscopy: Investigation of choice**
   - ❖ For type & extent of tissue damage
   - ❖ Age: 50- 55 years, with atypical or extra esophageal symptoms
   - ❖ If Complication (esophageal stricture, Barrette, metaplasia and esophageal carcinoma) suspected
4) **Esophageal manometry: (esophageal motility)**

Rx: **Date:** **Time:**

- **Diets:** Healthy diet, avoid; alcohol, coffee, chocolate, fatty foods, acidic foods
- Frequent small meal
- Weight reduction, Stop Smoking
- **Bed head Side elevation: 6** inch

Main Stay of treament: low dose PPI for long time.

- **Cap Esomeprazole 20mg (Nexum, Ezomol)** 1+0+0 before breakfast for 1-2 months
- **Syrup Gaviscon** 2 TSF-TDS 14 days

If esophagitis at endoscopy and Patient remains Symptomatic on PPI: Double the dose of PPI for further 6 weeks

Cap Esomeprazole 40mg(Nexum, Ezomol) 1+0+0 before breakfast for 6 weeks

If inadequate response to PPI: Add (on, off)

Tab Domperidone 10mg (Motilium) 1+1+1 for 1 month **OR**
Tab Metoclopramide 10mg (Maxolon) 1+1+1 for 1 month
Treat co-existing Constipation: As constipation can exacerbate GERD

Refer to surgery: If quality of life remains significantly impaired or severe symptoms persist despite optimal treatment: Laparoscopic fundoplication

Barium Study: 1) In Patient with severe dysphagia, it is sometimes, obtained prior to endoscopy to identify a stricture
2) Esophageal PH or combined esophageal PH impedance testing
3) Esophageal PH: Measures the amount of esophageal acid reflux

DYSPEPSIA

Chief Complaint:

- Epigastric discomfort, bloating, Nausea
- Usually young patient <40 years

Past Hx: NSAIDs, steroids, iron, K^+, Digoxin &.alcohol intake
Rule out pregnancy in females

Diagnosis: Diagnosis is often from history no investigation is needed in young patients.

Investigation:

1) Upper GI endoscopy

Indication: weight loss, anemia, vomiting, hematemesis/melena, dysphagia, palpable abdominal mass, age >55 years, younger patient unresponsive to empirical tretament

Rx: **Date:**

Non-Pharmacological:

- **Diets:** Healthy diet, avoid; alcohol, coffee, chocolate, fatty foods, acidic foods
- Give reassurance , life style modification
- Psychotherapy & hypnotherapy may be beneficial in some patient

Pharmacological: (Functional Dyspepsia)

- **Tab Itopride Hcl 150mg (ITP OD, Ganaton OD)** 1+0+0 before breakfast for 1 month
- **Tab Nortriptyline 25mg (Sensival)** 0+0+1 (25-50mg at night) for atleast 3 months
- **Tab Metoclopramide 10mg (Metomide)** 1+1+1 before meal **OR** **Tab Domperidone 10mg (Motilium)** 1+1+1 before meal

If H.Pylori positive then: H.Pylori eradication therapy

PEPTIC ULCER DISEASE (PUD)

Definition: A break in the gastric or duodenal mucosa characterized by recurrent epigastric pain and has three notables' characteristics: 1) localization to the epigastrium, 2) relationship with food and 3) episodic occurrence
Ulcer Symptoms characterized by Rhythmicity and Periodicity.

Chief Complaint:

- Epigastric pain (dyspepsia) (80-90%)
- Pain is localized to epigastrium
- Nature of pain: dull, aching or hunger like
- Nocturnal pain that awakens the patient in 2/3 duodenal ulcer of 1/2 gastric ulcers
- Periodicity of pain: Symptom last for several weeks with interval of month to years in which Patient are pain free
- Nausea, vomiting (mostly in gastric ulcer)

Hx of: Smoking, alcohol intake, spicy food intake, anxiety, stressful occupation

Drugs Rx: Aspirin, NSAIDS, Steroid, Bisphosphonate

O/E: Vitals, JACKLET, Abdomen: Epigastric tenderness, duodenal point tenderness

Investigation:

1) **ECG:** (to exclude ACS) **CBC:** (anemia)
2) **Upper GI endoscopy:** (Investigation of choice)
3) **Culture of gastric biopsy:** specificity; 100%
4) **Test for H.Pylori:**
   - **Stool antigen for H. pylori, Urea breath test:** In Patient with history of PUD to diagnosed active infection or in patient following its treatment to conform successful eradication
5) **Serum Amylase:** Elevated (In Patient with severe epigastric pain suggest ulcer penetration into the pancreas)
6) **USG abdomen:** To exclude gall stones
7) **Fasting Serum gastrin level:** To exclude ZES (Zollinger-Ellison syndrome)

Causes: Major causes are NSAIDs and H.Pylori infection, others includes ZES, Malignancy etc.

Rx: **Date:** **Time:**

Diet: Avoid excessive spicy and oily food.

Lifestyle changes: Sleep early, wake up early, avoid excessive stress, alcohol & smoking

Avoid: NSAIDs and Steroids

- **Cap Esomeprazole 40mg (Nexum, Ezomol)** 1+0+0 30 min before breakfast **OR** **Tab Famotidine 20mg (Famoit) 1+0+1**
- **Syp Sucralfate (Ulsanic)** 2TSF TDS

If H.Pylori +: H. Pylori eradication therapy

Anti-Pylori regimen for 14 days : Options are

STANDARD BISMUTH QUADRUPLE THERAPY

1. **Cap Esomeprazole 40mg (Nexum, Ezomol)** 1+0+1 before meal for 14 days
2. **Tab Bismuth subsalicyclate 265mg (Bismol)** 1+0+1 for 10 days
3. **Tab Tetracycline 500mg** 1+1+1+1 10days
4. **Tab Metronidazole 400mg (Riam, Flagyl)** 1+1+1 for 10 days **OR:**

1. **Cap Esomeprazole 40mg (Nexum, Ezomol)** 1+0+1 before meal for 14 days
2. **Cap Pylera** (Bismuth subcitrate K^+ 140mg + Metronidazole 125mg + Tetracycline 125mg) 3+3+3+3 for 10 days

STANDARD NON BISMUTH QUADRUPLE THERAPY

1. **Tab Amoxicillin 500mg (Amoxil,)** 2+0+2 – 10 days
2. **Tab Metronidazole 400mg (Riam, Flagyl)** 1+1+1 - 10 days
3. **Tab Clarithromycin 500mg (Claritek, Klue)** 1+0+1 - 10 days
4. **Cap Esomeprazole 40mg (Nexum, Ezomol)** 1+0+1 (before meal) - 14 days

STANDARD TRIPLE THERAPY: No longer recommended except in areas where Clarithromycin resistance is <15 %

1. **Tab Amoxicillin 500mg (Amoxil,)** 2+0+2 – 10 days **2.Tab Clarithromycin 500mg (Claritek, Klue)** 1+0+1 - 10 days
3. **Cap Esomeprazole 40mg (Nexum, Ezomol)** 1+0+1 (30 mins before meal) - 14 days

Levofloxacin Triple therapy

1. **Tab Levofloxacin 500mg (Leflox)** 1+0+1 - 7 days
2. **Tab Amoxicillin 500mg (Amoxil)** 1+0+1 - 7 days (If penicillin allergic then Tab Flagyl 400mg P/O TDS)
3. **Cap Esomeprazole 40mg (Nexum)** 1+0+1 14 days

If penicillin allergic then:

1. **Tab Clarithromycin + Omeprazole + Metronidazole (HELICURE)** 1+0+1 - 7 days then
2. **Cap Esomeprazole 40mg (Nexum, Ezomol)** 1+0+0 - for next 7 days

❖ NOTE: **If ulcer is >1 cm or complicated:** Extend PPI for 4 To 6 weeks

Active ulcer not Attributable to H.Pylori : Consider other causes; ZES, gastric malignancy

- **PPI:** uncomplicated duodenal ulcer; Treatment for 4 weeks/ uncomplicated gastric ulcer; TX for 8 weeks
- **H-2 receptor antagonist: uncomplicated duodenal ulcer**; Cimetidine 800mg, Nizatidine 300mg, famotidine 40mg, OD at night for 6 weeks **/ uncomplicated gastric ulcer**; Cimetidine 400mg, Nizatidine 150mg, famotidine 20mg, BD for 8 weeks, **Complicated ulcer**: PPI are preferred drugs

Cap Omeprazole 40mg (Risek, Zolbi)/ Cap Esomeprazole 40mg (Nexum, Ezomol) or
Tab Rabeprazole 20mg (Rabiced)/ Cap Dexalansoprazole 30-60mg (Delanzo DR) or
Tab pantoprazole 40mg (Zopent, PROTONIX, PROTIUM)

PREVENTION OF ULCER RELAPSE:

A) NSAID INDUCE ULCER: Prophylatic therapy for high risk Patient (prior ulcer disease or ulcer complication, use of corticosteroids or anticoagulants, age >60yrs, Co-morbidities Treatment is : Stop NSAIDs Plus + any PPI OD + Celecoxib + Misoprostol

- **Cap Esomeprazole 40mg (Nexum, Ezomol)** 1+0+1 before meal
- **Tab CeleCoxib 100mg (Celbex)** 1+0+1 (contra: I n patient with high risk of CVS disease)
- **Tab Misoprostol 200 mcg (Cytotec, Breeky)** 1+1+1+1

B) LONG TERM maintenance THERAPY: Indicated in patient with recurrent ulcers who either are H.Pylori negative or who have failed attempts at eradication therapy : Treatment is PPI once daily (CMDT-2023)

Indication of H. Pylori Eradication therapy:

- ❖ All Patient with proven gastric or duodenal ulcer **or** H. pylori (stool antigen or urea breath test) positive **or** MALTOMA **or** Strophes gastric **or** After gastric cancer resection
- ❖ First degree relatives of Patient with gastric Ulcers
- ❖ H. pylori infection should by sought for & treatment in unexplained Iron deficiency anemia, ITP

Indication for surgery:

- ❖ **Emergency:** Perforation, Hemorrhage
- ❖ **Elective:** Gastric outflow obstruction **or** Persistence ulceration despite adequate medical therapy **or** Recurrent ulcer following gastric surgery

CONSTIPATION

Definition: Infrequent Stools (<3 times a week) hard or lumpy stools, excessive Straining, or a sense of incomplete evacuation of stool or anorectal blockage

Chief Complaint:

1. Infrequent stools or bowel movement
2. Abdominal pain, fullness, Nausea, vomiting
3. Alarming Signs: Hematochezia, weight loss, age >55 years, dysphagia, iron deficiency anemia, weight loss, Odynophagia

Past Hx: Diet; low fiber diet, reduce fluid intake

Drug: opiates, anticholinergic, Calcium channel blocker, Iron Aluminum containing antacid.

O/E: Digital rectal examination, Protoscopy, vitals

Investigation: If alarming Sign or age >40 years

1) CBC, TSH, FT4, Serum Calcium, RBS, S-electrolyte.
2) Barium enema/Colonoscopy

Rx: Date: Time:

- **Diet:** High fiber Containing diet, milk, increase fluid intake
- **Isphaghul husk** 2TSF in 1 glass of water 2 OR 3 times a day
- **Syp. Lactulose 120ml (Lilac)**, 2 TSF-TDS **OR**
  Syp. Sodium Pico sulfate (Laxoberon) 2TSF-TDS

If abdominal pain can also add:

- **Mevulak sachet (Mebeverine HCL+ Isphaghul hush)** 1+1 (in a glass of water)
- **If still constipated:**
  Refer to Gastroenterologist

❖ NOTE: **If ulcer is >1 cm or complicated:** Extend PPI for 4 To 6 weeks

Active ulcer not Attributable to H.Pylori : Consider other causes; ZES, gastric malignancy

- **PPI:** uncomplicated duodenal ulcer; Treatment for 4 weeks/ uncomplicated gastric ulcer; TX for 8 weeks
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B) LONG TERM maintenance THERAPY: Indicated in patient with recurrent ulcers who either are H.Pylori negative or who have failed attempts at eradication therapy : Treatment is PPI once daily (CMDT-2023)

Indication of H. Pylori Eradication therapy:

- ❖ All Patient with proven gastric or duodenal ulcer **or** H. pylori (stool antigen or urea breath test) positive **or** MALTOMA **or** Strophes gastric **or** After gastric cancer resection
- ❖ First degree relatives of Patient with gastric Ulcers
- ❖ H. pylori infection should by sought for & treatment in unexplained Iron deficiency anemia, ITP

Indication for surgery:

- ❖ **Emergency:** Perforation, Hemorrhage
- ❖ **Elective:** Gastric outflow obstruction **or** Persistence ulceration despite adequate medical therapy **or** Recurrent ulcer following gastric surgery

CONSTIPATION

Definition: Infrequent Stools (<3 times a week) hard or lumpy stools, excessive Straining, or a sense of incomplete evacuation of stool or anorectal blockage

Chief Complaint:

1. Infrequent stools or bowel movement
2. Abdominal pain, fullness, Nausea, vomiting
3. Alarming Signs: Hematochezia, weight loss, age >55 years, dysphagia, iron deficiency anemia, weight loss, Odynophagia

Past Hx: Diet; low fiber diet, reduce fluid intake

Drug: opiates, anticholinergic, Calcium channel blocker, Iron Aluminum containing antacid.

O/E: Digital rectal examination, Protoscopy, vitals

Investigation: If alarming Sign or age >40 years

1) CBC, TSH, FT4, Serum Calcium, RBS, S-electrolyte.
2) Barium enema/Colonoscopy

Rx: Date: Time:

- **Diet:** High fiber Containing diet, milk, increase fluid intake
- **Isphaghul husk** 2TSF in 1 glass of water 2 OR 3 times a day
- **Syp. Lactulose 120ml (Lilac)**, 2 TSF-TDS **OR**
  Syp. Sodium Pico sulfate (Laxoberon) 2TSF-TDS

If abdominal pain can also add:

- **Mevulak sachet (Mebeverine HCL+ Isphaghul hush)** 1+1 (in a glass of water)
- **If still constipated:**
  Refer to Gastroenterologist

IRRITABLE BOWEL SYNDROME (IBS)

Definition: Gastrointestinal manifestation without organic cause in which patient represented by constipation or diarrhea or alternating constipation, diarrhea associated with abdominal pain.

Chief Complaint:

- Abdominal pain: any site (especially in left iliac fossa, following meals or stress and relieved by flatus or stools
- Rome III Diagnostic criteria:
  Recurrent abdominal pain or discomfort ≥3 days per month in the last 3 months, & ≥2 of the following
1. Improvement or relieveo of pain with defecation
2. Onset associated with a change in frequency of stool
3. Onset associated with a change in form (appearance) of stool
- Features of anxiety and stress may be present
- Non- GIT features: Halitosis, Headache, insomnia dysmenorrhea, premenstrual tension

Diagnosis: It is clinical diagnosis but Investigation are done to exclude organic cause

O/E: Vitals, JACKLET
Tenderness over left iliac fossa

Investigation:

1) **CBC, RBS, CRP**
2) **Serum creatinine, SGPT, TSH**
3) **U/S Abdomen + Pelvic, stool R/E**
4) **If age > 40year; Colonoscopy**
5) **Fecal Calprotection** to exclude Irratible bowel disease
6) **Tissue transglutaminase (tTG)** to exclude Coeliac disease

Types:

IBS-D (IBS with diarrhea)
IBS-C (IBS with constipation)
IBS-M (IBS with both diarrhea and constipation)

Trigger of IBS:

- Anxiety / depression, stress, GIT infection,
- Prolong antibiotic therapy, Diet with less fiber
- Sexual or physical abuse
- Late sleep at night or less sleep

Rx: Date: Time:

- **Diet:** Increase high fiber diet, fluid intake
  Avoid: Fatty foods, alcohol, caffeine, Spic food, and grains
- **Psychotherapy:** Reassurance

For abdominal pain:

- **Tab Mebeverine 135mg (Colofac)**
  1+1+1 **OR**
  Tab Hyoscyamine 125mg (Anapaz)
  1 tab SOS

IF CONSTIPATION PREDOMINANT:

SSRI + Laxative

- **Syp. Lactulose (Laxoberon)**
  2TSF TDS-till constipation persist
- **Isphaghul or Psyllium**
  2TSF in a glass of water BD
- **Tab Imipramine 25mg (Tofranil)**
  ½ tab initially then 1 tab daily at night for 1 month, then adjust accordingly
- **Tab Fluoxetine 20mg (Flux, Prozac)**
  1+0+0 for atleast 3 month **OR**
  Tab Escitalopram 10mg (Citanew)
  ½ +0+0 for 6 days then 1+0+0 OD **OR**
  Tab Paroxetine 20mg (Seroxate)
  1+0+0 OD

IF DIARRHEA PREDOMINANT:

- **Cap Loperamide 2mg (Imodium)**
  2 cap stat then 1 cap after each purgation
- **Tab Rifaxamin 550mg (Rifixa)**
  1+0+1 for 14 days
- **Tab Amitriptyline 25mg (Amyline)**
  0+0+1 – continue
- **Trail of low:** FODMAP or gluten free diet, Avoid excessive dietary fibers

AVOID Triggers

ULCERATIVE COLITIS (UC)

Definition: It is a recurrent, chronic, ulcero-inflammatory disease limited to colon and rectum

Chief Complaint:

- Rectal bleeding, Bloody diarrhea with replapse and remission
- Tenesmus
- Left lower quadrant abdominal pain
- Malaise, weight loss, anorexia

Past Hx: Gastroenteritis, stress, infection, Antibiotic or steroid

O/E: Vitals, JACKLET, Abdominal examination

- Sign of peritoneal inflammation

(Nausea, Vomiting, abdominal pain, fever etc.)

Investigation:

1) **CBC:** Anemia
2) **ESR & CRP:** Raised
3) **Serum Albumin:** (low in severe case)
4) **Colonoscopy:** (pseudo polyps)
5) **Confirmative test**
   - **Colonoscpy with Biopsy conform diagnosis**
   - Fecal Calprotection
6) **Serological testing; ANCA:** Positive in UC
7) **For DD:** (different diagnosis)
   - STOOL R/E & culture: to exclude C.difficile
   - Blood culture: for infection
8) **Other:**
   - **X-ray abdomen** (perforation, obstruction)
   - **USG** abdomen + pelvis (liver abscess, portal vein thrombosis
   - Risk of colorectal cancer high in UC than Crohns diasese

NOTE: Smoking has protective effect in UC

Rx: Date: Time:

- Inj. NS IL+ Dextrose 5% 500ml IV @ 25 drops/min
- **In Hydrocortisone 250mg (Hyzonate)** 1 vial IV stat and BD **OR** **Inj. Methylprednisolone 40mg/ml (Depo-medrol)** 1.5ml IV stat and BD
- **Inj. Omeprazole 40mg (Risek, Ruling)** 1 vial IV stat and BD
- **Inj. Ceftriaxone 1gm (Oxidil, Rocephin)** 1 vial IV stat and BD (After test dose)
- **Inj. Ketorolac 30mg (Toradol)** IV stat, TDS
- **Inj. Enoxaparin 60mg (Clexane)** S/C stat and BD (1mg/kg/dose) 3 days

If Hb < 10gm/dl: Blood transfusion

If no response to steroid in 3-5 days: then
Inj. Infiximab 100mg + inf NS 100ml IV @ 12 drops/min stat

If don't response in 7-days,
colonic dilation >6cm, clinical or lab measurement

Deteriorate: Colectomy

In active left side or extensive UC: Top and tail approach combination of once daily topical and oral aminosalicylic acid

Rx on discharge:

1) Tab Mesalazine 400mg 2+0+2 - continue
2) If co-existence arthropathy then
   Tab sulfasalazine 500mg 1+0+0 – 7days
   Then 1+0+1 – 7days then 1+0+2 – 7days
   Then 2+0+2 – continue
3) **Cap omeprazole 40mg (Teph-Insta)** 1+0+1 for 1 month
4) **Tab Calcium + vit D (Qalsium-D)** 1+0+1- 1 month
5) **Inj. Vit-D (D-tress)** once weekly PO for 1 month

Inducing remission:

1) Rectal (topical) amino salicylcates (Mesalazines) or steroids 2) Oral amino salicyclates 3) oral prednisilones (2^{nd} line)

Maintaining remission:

1) Oral amino salicyclates (Mesalazine) 2) Azathioprine and mercaptopurine

CROHN'S DISEASE (CD)

Definition: A chronic inflammatory disease that involves entire colon from mouth to anus but most commonly affects terminal ileum. But rectum generally spared. Affects females > males and strongly associated with smoking

Chief Complaint:

- Abdominal pain usually aggravated by food
- Diarrhea (watery, non-bloody)
- Weight loss (more prominent)
- Upper GI symptoms: mouth ulcers
- Gallstones, Oxalate renal stones
- Intestinal obstruction features

O/E:

- Vitals, Abdominal examination
- Abdominal tenderness; +
- **Palpable abdominal mass in RIF: +**
- Features of fistula, anal tags, fissures

Investigation:

1) **CBC with ESR** (raised)
2) **CRP (raised)**
3) RBS, Serum Electrolyte
4) X-Ray erect abdomen
(AP view including both dome of diaphragm)
5) **Ultrasund Abdomen + Pelvis**
6) **Endoscopy of upper GI + Colonoscopy**
   - **Colonoscopy with biopsy conform diagnosis**
   - Deep ulcer, Skip lesion
   - **Cobble- stone appearance**
7) **Serological Testing: Anti-saccharomyces cerevisiae antibody (ASCA): + in CD**
8) Barium follow through
   - **Strictures: "Kantor's string sign**
   - **Rose thron ulcer**

Note: Stop Smoking

Rx: Date: Time:

- **NPO** (NO PER ORAL): If vomiting, toxic mega colon or intestinal obstruction
- **Diet:** Low fat medium chain triglyceride diet, Crohn's patients are lactose intolerant so a dairy free diet may reduce the frequency of diarrhea
- **Inf. Dextrose 5%** IL
  IV @ 25 drops/min
- **Inj. Ceftriaxone 1 gm (Oxidil, Rocephin)**
  1 vial IV stat and BD (After test dose "ATD")
- **Inj. Omeprazole 40mg (Teph-Insta, Risek)**
  1 vial IV stat and OD
- **Inj. Hydrocortisone 250mg (Hyzonate)**
  1 vial IV stat and BD **OR**
  Inj. Methylprednisolone 40mg (Depo-Medrol) IV stat and 0D
- **Inj. Ketorolac 30mg (Toradol)** IV stat, TDS

Rx on discharge:

- **Tab Prednisolone 10mg (Deltacortil)**
  4+0+0 for 1 month
- **Tab Azathioprine 50mg (Imurax, Azap)**
  1+0+1 - continue
- **Cap Esomeprazole 40mg (Nexum, Ezomol)** 1+0+0 – 1 month
- **Inj. Vit-D (D-tress)** 1 amp in half glass of water every week for one month
- **Tab Cac1000** 0+1+0 one month

In case of ileal Crohn's disease:

- **Tab Budesonide 3mg** 1+0+0 – 6 weeks

Drugs dose reduction over the subsequent
2 week when the therapy is topped

Inducing remission:

1) Glucocorticoids **2)** 5-ASA drugs (e.g, Mesalazine) 2nd line to glucocorticoids 3) Azathioprine or mercaptopurine
4) Infiximab (useful in refractory disease). 5) Metronidazole (for isolated peri-anal disease)

MACROPHAGE ACTIVATION SYNDROME (MAS)

Definition: Hemophagocytic lymphohistocytosis (HLH) is a variety of MAS

MAS is life threatening complication of rheumatic disease that occurs much more frequently in children with SJIA (Systemic Juvenile Idiopathic Arthritis), SLE, adult onset still disease and Kawasaki disease

Caused by activation & proliferation of lymphocyte and macrophage which lead to hemophagocytosis and cytokine over production which cause severe tissue damage, macrophage phagocyte RBCs WBC & Platelets

Chief Complaint:

- Acutely ill
- Sudden onset of non-remitting high fever, Purpura, jaundice, bleeding tendency, seizures, coma
- Rashes on the scalp and behind ear (scaly & waxy lesion)
- Features of anemia, leukopenia, thrombocytopenia

Past Hx: Liver disease, sepsis, kidney disease, heart failure

On Examination:

- Vitals (Pulse, BP, Spo2%, Temp, RR) JVP
- Hepatosplenomegaly, lymphadenopathy

Investigation:

1) **CBC:** Anemia, leukopenia, thrombocytopenia), **RBS**
2) **LFTS:** (elevated liver enzymes level)
3) **PT/aPTT, INR**
4) **Serum creatinine, Urine R/E**
5) **Infection screen**
6) **Lipid profile, serum LDH**
7) **Serum Electrolyte** (low Na)
8) **Ferritin levels**, Bone marrow examination (>10,000mg/ml)

Criteria for MAS Diagnosis:

Any of 2 or more than following lab criteria **or** 2 or more of the following clinical criteria

A. Laboratory Criteria

1.↓platelet count (< 262K),
2.↑ AST(>59 U/L)
3.↓ WBC count(<4 x 10/L)
4. Hypofibrinogenemia (<2.5 g/L)

B. Clinical criteria:

1. CNS dysfunction (e.g. irritability, disoriented, lethargy, headache, seizures, coma),
2. Hemorrhage (e.g. Purpura, easy bruising, mucosal bleeding),
3. Hepatomegaly (>3 cm below the costal margin)

Rx: Date: Time:

- Bed rest
- Maintain airway, breathing, circulation
- If circulation collapse
  Inf. NS IL IV 30ml/kg/hour bolus, then IV @ 40 drops/min
  if shock treat with inotropes(e.g norphine)
- **Inf. Immunoglobulin IV**
- **Inj. Omeprazole 40mg (Teph-insta, Risek)** IV stat and OD

Pulse steroids

- **Inj. Methylprednisolone 1000mg (Depo-medrol)** in 100ml NS IV for 3 days
  Then start oral steroids
  Tab Prednisolone 10mg (Deltacortil)
  (1mg/kg, slowly taper the dose)

Alternate is Cyclosporine

In primary HLH with refractory, recurrent or progressive disease or intolerance with conventional HLH therapy,
Then

Inj. Emapalumab-50mg (1mg/kg)
Inj. Dexamethasone (Dexa) 1.5cc (2 vial)
Dose: 1mg/kg IV infusion over 1 hour twice per weekly

Differential Diagnosis (DDS)

- Flares of underlying disease, infections, sepsis
- EBV viral infection, dengue fever, scrub typhus babesiosis
- Side effect of medication (traditional medication)
- Autoimmune diseases

UPPER GI BLEED (HAEMATEMESIS / MELENA)

Esophageal varies (Portal HTN), varicel bleed & Peptic ulcer disease bleed lead to upper GI bleed.

Chief Complaint:

1. Hematemesis (vomiting out of blood): bright red or coffee ground color
2. Passage of black tarry stool
3. Alter sensorium, generalized body weakness

- Symptoms of anemia suggest bleeding

4. **Clinical features of Portal HTN (ABCDEFGH)**
   - **A**scites,
   - **B**leeding (Hematemesis, Hemorrhoids),
   - **C**aput medusa, **D**istended abdominal veins, **E**nlarge spleen, **F**etor hepaticus
   - **G**astric endoscopy (varies), **h**epatic degeneration
5. **C/F esophageal varices** (varicel bleed)

- Pallor; may suggest active internal bleeding
- Painless hematemesis with or without melena
- Sudden or massive bleeding with or without shock and hypovolemia
- Hematochezia may indicate bleeding from colopathy or enlarge hemorrhoids

Past Hx: Chronic liver disease, carcinoma of stomach, Hypertension, drug; NSAIDS, Steroids, Aspirin

O/E: Vitals, JACKLET, GCS

Investigation:

1) **Upper GI endoscopy**; Fibro-optic endoscopy
   All patients with upper GI bleeding should undergo upper GI endoscopy within 24 hours of arriving in the emergency department
2) CBC, Blood group & Rh typing cross match
3) Coagulation profile, serum creatinine
4) Serum Uric acid and serum electrolyte
5) USG abdomen (splenomegaly, dilated vein)

Esophageal Varies: Extremely dilated sub mucosal vein in the lower 3rd of esophagus.

Arrange 2 pint of RCC: for correction of blood loss to prevent shock

Hematemessi; Vomiting of red blood or coffee ground

Melen; Black tarry stool resulting from from degradation of blood by intestinal bacteria

Hematochezia; Bright red blood per rectum

Rx: **Date:** **Time:**

- Bed rest, No per oral (NPO)
- **O2 inhalation** stat and SOS
- If patient is in shock; manage with IV fluid (NS / Haemacil) + Blood transfusion
- **Inj. NS 2 L IV** @ 30drops/min
- **Inj. Pantoprazole 40mg (Zopent, Zebtro)** 1 vial IV stat and BD
- **Inj. Metoclopramide 10mg (Metomide)** IV stat and TDS
- **Inj. Vit K 10mg** IV OD for 3 days

If thrombocytopenia(Platelet <50 k); Platelet transfusion

If INR > 1.8: FFPs (Fresh Frozen Plasma)

For varicel bleeding:

- **Inj. Octreotide (Sandostatin)** 50mcg IV stat and 50mcg/hour infusion for 5 days **or**
  Terlipressin (Terlip) 2mg IV bolus then 1mg every 4-6 hourly for 3-5days **OR**
  Somatostatin; 250mcg bolus then 250mcg/hr infusion
- **Syp. Lactulose (Duphalac)** 2TSF stat & TDS

For Peptic ulcer disease (PUD) Bleeding:

- **Inj. Pantoprazole 40mg** 2 vial IV stat and, then Inj. Omeprazole 40mg (Risek) 5 vial + inf NS IL IV @ 10 drops/min (8mg/ hour)
- **Inj. Terlipressin (Terlip)** 2mg IV stat & QDS
  Initial dose; 2mg every 4 hourly & can be tittered down to 1mg IV every 4 hours
  once hemorrhage is controlled then start

Beta blocker; once bledding stop start

- **Tab Propranolol(Inderal)** 10mg 2+0+2 continue **OR**
  Tab Carvedilol (Carveda) 3.125mg BD continue

Antibiotic:

- **Inj. Ceftriaxone 1gm(Oxidil)**
  IV stat and BD (After test dose) **OR**
  Inf. Ciprofloxacin 100ml (Novidat) IV Stat and BD

Endoscopy with intervention:

Within 24 hours after adequate resuscitation

- Endoscopic varicel ligation (EVL) & TIPSS Sclerotherapy, Endoscopic band ligation

ACUTE LIVER FAILURE (ALF)

Definition: Is diagnosed by elevated SGOT,SGPT, hepatic encephalopathy, & elevated PT/ INR ratio,
Time: < 26 weeks; (Hyperacute < 7days, acute; 7-21 days, subacute > 21 day & < 26 week)
Also called fulminant hepatic failure, acute hepatic necrosis and fulminant hepatitis

Chief Complaint:

- Any degree of hepatic encephalopathy, see hepatic encephalopathy topic
- Fatigue, malaise, lethargy, anorexia
- Nausea and/or vomiting, right upper quadrant pain, Pruritus, Jaundice
- Abdominal distension from ascites

Past Hx: Liver diseases, drugs

O/E:

- Vitals, JACKLET, GCS
- Abdominal examination

Investigation:

1) **PT:** Elevated, INR ≥ 1.5) important criteria
2) **SGOT, SGPT ;** Markedly Elevated (in 1000)
3) **Serum Bilirubin;** Elevated (mostly > 16)
4) **CBC:** Platelet ≤ 150,000/mm^3 but this is variable & has associated with portal Hypertension
5) **Other:** Viral markers, Wilson disease Investigation

Toxicology screen, Paracetamol level
Autoimmune hepatitis screen

Other Labs finding may be seen

- Hemolytic anemia
- RBS (Hypoglycemia)
- **Elevated:** Creatinine, ammonia & LDH level
- **Decrease:** phosphate, potassium, magnesium

Rx: Date: Time:

- Bed rest, 30 degree head elevation

❖ **If patient with grade II encephalopathy:**

- Refer to ICU for monitoring

❖ **If PT, aPTT Prolong, abnormal bleeding then**
Fresh frozen plasma (FFP) transfusion 15ml/kg body weight or 4 unit will correct the deficiency

❖ **If fibrinogen level very low: < 80mg/dL**
consider Cryoprecipitate

- **Syrup Lactulose (Duphalac)**
  30-60 ml (6TSF) every hour until diarrhea occur then 15-30ml/day or 2 TSF TDS
- **Tab. Rifaxamin 550mg (Rifaxa)** 1+1 14 days
- **If suspected SBP** (Spontaneous Bacterial Peritonitis)
  Inj. Ceftriaxone (Oxidil) 1mg IV BD **or**
  inj. Cefotaxime (Claforan) 1gm IV-BD
- **Syp. Hepa-Merz** 2TSF TDS

If seizures occur:

- **Inj. Diazepam (Valium) 10mg** IV stat
- **Inj. Levetiracetam (Lerace)** 500mg 1 Vial IV BD

If paracetamol (acetaminophen toxicity) then

- See topic in Poisoning potion

If Benzodiazepine poisoning; Then

- **Inj. Flumazenil (not routinely use)**
  Doe: 0.2mg IV over 15 second, then 0.2mg every minute up to 1 mg total

Find underlying cause & treat

Monitor:

❖ Carefully monitor & maintain patient metabolic status, hydration, electrolyte, oxygen, Nutrition, hypoglycemia Hyponatremia

❖ Monitor sign & Symptoms of raise intracranial pressure

Causes:

- Paracetamol, Idiosyncratic (drug reaction),
- Viral & Alcoholic hepatitis, toxin exposure
- Autoimmune hepatitis, Wilson diseases
- Acute fatty liver of pregnancy / HELLP syndrome
- Ischemic hepatopathy & Budd-chiari syndrome, veno-occlusive
- Malignant infiltration, sepsis, heat stroke & Hemophagocytic lymphohistocytosis

King's College criteria

Acute liver failure (ALF) due to Paracetamol

- Arterial pH <7.3 after resuscitation and >24 h since ingestion
- Lactate >3 mmol/L or
- The following 3 criteria:
  - Hepatic encephalopathy >grade 3
  - Serum creatinine >300 µmol/L
  - INR > 6.5

Acute liver failure (ALF) not due to paracetamol

- INR >6.5 /PT>100 seconds or
- 3 out of 5 following criteria
  - Etiology: indeterminate etiology hepatitis, drug-induced hepatitis
  - Age between 10years and 40 years
  - Interval jaundice-encephalopathy >7 days
  - Bilirubin >300 µmol/L (or >17.5mg/dl)
  - INR >3.5/PT>50 seconds

Features of common viral hepatitis:

	Hepatitis A	Hepatitis B	Hepatitis C	Hepatitis D	Hepatitis E
Spread					
Stool	++	-	-	-	++
Blood	-	+	+	+	-
Saliva	+	+	+	-	-
Sexual	-	+	-/+	+	-
vertical	-	+	-/+	+	-
Chronic infection	No		+ (85%)	+	-
Prognosis	Excellent				
Severity	Mild				
Fulminant Hepatitis	0.1%	0.1-1%	0.1%	5-20%	1-2%(10-20% in pregnancy
Treatment					
	None			Treat Hep B	none
Prevention					
Active immunization			No Vaccine		
Passiveimmunization			No Vaccine		No Vaccine

CHRONIC LIVER DISEASES (CLD)

Chief Complaint:

- Any degree of hepatic encephalopathy
- Fatigues, malaise, lethargy, anorexia
- Nausea, vomiting, epigastric discomfort
- Pruritis, jaundice, abdominal distension
- Cachexia (Muscle and fat loss): wasting temporalis muscle, reduce triceps, skin fold thickness)
- **Past Hx:** Any liver diseases, Drug history

On Examination:

- Vital (Pulse, BP, Spo2%, Temp,), JACKLET, GCS
- Hepatosplenomegaly, abdominal distention
- Clubbing, Leuconychia, Palmar erythema spider naevi, Petehiae and ecchymosis
- Gynaecomastia, and loss of body hair
- Caput medusa, edema

Instigation:

1) PT, aPTT, INR, LFTS, Serum Bilirubin
2) CBC, Serum albumin, viral markers
3) RFTS, serum electrolyte
4) Serum creatinine, BUN, Serum LDH
5) U/S Abdomen + Pelvis.

Child-Pugh score to access severity of cirrhosis

Score	1	2	3
Bilirubin(mmol/L)	<35	35-52	>50
Ascites	Nil	Mild	Moderate
Encephalopathy	Nil	1-2	3-4
PT	1-4	4-6	>7
Albumin	>35	28-35	<28

- Score> 10 (grade C) – 33% 1 year mortality
- Score> 7-9 (grade B) - 80% survive 5 years
- Score 5-6 (grade A) – 90% survive 5 years

Rx: **Date:** **Time:**

- **Diet;** salt restriction- 2 gm Nacl
  Fluid restriction: 1L /day

Dietary protein: Replace animal based protein with vegetable-based protein

Target weight loss/day

1) 1kg/day if both ascites + edema present
2) 0.5kg/day if only Ascites

- **Tab Spironolactone + Furosemide (Spiromide-40)** 1+0+0 (can increase up to 400+160mg/day)
- **Syrup Lactulose (Duphalac)**
  30-60 ml (6TSF) every hour until diarrhea occur then 15-30ml/day or 2 TSF TDS
- **Inj. Pantoprazole 40mg (Zopent, Neege)**
  1 vial IV stat and BD
- **Tab. Rifaxamin 550mg (Rifaxa)** 1+1 14 day (Alternative Metronidazole, neomycin)
- **Syp. Hepa-Merz** 2TSF TDS

If suspected SBP (Spontaneous Bacterial Peritonitis):

- **Inj. Ceftriaxone 1 gm (oxidil)** IV BD (ATD)
- ❖ **If bleeding (see topic upper GI bleed)**
- ❖ **Avoid:** sedative, NSAID, high protein diet, hypovolemia, hypokalemia, hypernatremia
- ❖ **Refractory Ascites:** (Ascites still present with diuretics and low sodium diet) then
- Large-volume paracentesis
- Transjagular intrahepatic portosystemic shunt (TIPS): to reduce portal pressure
- ❖ Beta-blocker (to reduce portal HTN)
- **Tab Propranolol (Inderal) 40mg**
  0+1+0 (contra in Asthma, COPD)

King's Collage (Criterion for liver transplantation in liver injury)

Acetaminophen	Non-acetaminophen
pH <7.3	INR >6.5/PT>100 seconds or any three of the following:
Lactate>3.5mM at 8 hours	INR >3.4/PT >50seconds
Lactate >3.0mm at 12 hours	Bilirubin >17.5mg/dl
Creatinine >3.4mg/dl	Jaundice for >7 days
INR > 6.5/PT > 100sec	Age between 10 and 40
Encephalopathy grade 3 or 4	Etiology: drug reaction or unknown

Sedation and Anticonvulsive: (In Liver diseases i.e. CLD)

- Benzodiazepines like midazolam given in single dose (1-2mg) However, benzodiazepines are best avoided. **Haloperidol** (Inj Serenace 5mg or Dosik drops) **a safer choice** in the presence of liver disease.
- Fentanyl (opioid) elimination is near normal in cirrhotic and can be used for sedation
- Propofol is preferred to benzodiazepines or opioids for endoscopic sedation for patients with decompensated cirrhosis due to its short half-life and lower risk of including encephalopathy.
- For pain management: Paracetamol at a dose < 2gm/day is a reasonably safe option. In case of inadequate pain relief, tramadol 25 gm every 8 hours can be used.
  IV fentanyl or fentanyl topical patch can be used
- General Anesthesia can reduce the hepatic blood flow resulting into decompensating. Drugs like isoflurane, desflurane are not significantly metabolized by the liver; hence, are safe combination of drugs like fentanyl may reduce the need of anesthetic agents. Propofol is also a good drug for combination anesthesia
- Seizure: Levetiracetam, Gabapentin and topiramate all are safe

HICCUPS

Characteristic sound produces by involuntary contraction of diaphragm

Successful cause-Specific hiccup therapies

Cause	Treatment
Addison disease	Steroids
Alcohol	Lemon wedge soaked in angostura bitters
Carcinomatosis	Ondansetron
Coronary disease	Nifedipine
Intraoperative	Stimulate pharynx with catheter
Parkinson disease	Amantadine
Reflux esophagitis	Acid suppressions
Renal Failure on dialysis	Baclofen
Over distended Stomach	NG tube

other pharmacological treatment are
Valproic Acid: 15 mg/kg/day
Phenytoin 200mg IV, 100mg QID,
Gabapentin: 1800 mg/day divided doses,
Amitriptyline: 10mg TDS, Interventional therapy

Rx: Date: Time:

Pharmacological Rx

1) **Inj. Chlorpromazine 25mg (largectil)** IM Stat & TDS **Or**
   Tab Largectil 25mg 1+1+1
   Or Syp Largectil 25mg/5ml 1TSF TDS
2) **Inj. Metoclopramide 10mg (Metomide)**
   1 amp IV stat & TDS **OR**
   Tab Metoclopramide 10mg (Metomide)
   1+1+1 **OR**
   Syp Metoclopramide (Metomide)
   1tsf TDS
3) **Tab Baclofen 10mg (Baclin, Febixil, Baclorax)**
   1+1+1
4) Inj. Xylocaine 1 ampule mix in glass of milk & drink then
   OR

Inj. Xylocaine 1 ampule mix in Syp mucaine or sup Ulsanic and take half bottle.

Non-pharmacological

- Valsalva manure, carotid sinus massage,
- breath holding, hyperventilation,
- mental distraction, digital ocular globe pressure,
- pulling the knee up to Chest and leaning forward

HEPATIC ENCEPHALOPATHY

Definition: It is a complex neuropsychiatric Syndrome characterized by disturbance in consciousness and behavior, personality changes, fluctuating neurologic signs, asterixis (Flapping tremors) and distinctive EEG Changes (Triphasic wave encephalopathy) commonly seen in chronic liver disease

Chief Complaint:

- Altered consciousness level (confused)
- Irritability, personality changes, inversion of Sleep pattern
- Foul smell (Foetor hepaticus) from mouth.

Past Hx: Acute or chronic liver disease

Drug Hx: Narcotics, Sedatives, diuretics

Stages

Stage 1 - Inversion of sleep pattern
Stage 2- Obvious asterixis, mild confusion
Stage 3 - Gross disorientation
Stage 4 - Come

O/E: vitals, JACKLET, Asterixis, Ascites

Investigation

1) RBS, Serum electrolyte, Serum Creatinine, CBC
2) FTS, RFTS, PT/aPPT/INR
3) USG Abdomen (Hepatobiliary System)
4) EEG: Choice of Investigation but not available routinely
5) Endoscopy of upper GI
6) Infection Screen
7) Ascetic fluid study
8) HBsAg, Anti HCV
9) Serum Ammonia

Note: Monitor vitals regularly
Input/output record

Precipitating factors

1) Infections
2) ↑ nitrogen load (GI bleeding, Excess dietary protein and Renal failure, Carcinoma, azotemia), Constipation
3) Electrolyte (metabolic imbalance), Hypokalemia(diuretic use), hypernatremia
4) Hypovolemia 5) Hypoxia 6) Alkalosis
7) Drugs: Narcotics, Sedatives, diuretics and tranquilizers.

Rx: **Date:** **Time:**

- **Bed rest:** If unconscious change posture 2 hourly
- **Diet:** Branched chain amino acid, low protein diet, carbohydrate rich diet,
  Avoid animal protein
- **Syrup Lactulose (Duphalac)**
  30-60 ml (6TSF) every hour until diarrhea occur then 15-30ml/day or 2 TSF TDS
- **Polyethylene glycol electrolyte solution** 4 Liter by NG, tube or orally for rapid clinical response
- **Tab Rifaxamin 550mg (Rifaxa)** 1+0+1 14 Days

Alternative are ; (Neomycin 500mg, 1gm TDS)
(or Tab Metronidazole 250 mg TDS)

- **Sodium phosphate (Kleen enema)** Stat, SOS
- If SBP (Spontaneous bacterial Peritonitis) suspected then add
  Inj. Ceftriaxone 1gm (Oxidil, Rocephin)
  1 vial IV stat & BD after test dose
- **Inj. Vit k 1** amp IM Stat & OD for 5 days
- If neuronal inhibition: Add Flumazenil
  Inj. Flumazenil 0.2mg Iv over 15 sec, then 0.2mg every min as needed up to 1 mg total
- **Inj. Omeprazole 40mg (Ruling, Risek)**
  1 vial IV Stat and BD
- **Inj. L-ornithine L-Aspartate 500mg/ml (Inj. Levijon)**
  1 amp in 500ml 5% dextrose IV BD
- **If raised ICP** (Intracranial Pressure)
  Inj. Mannitol 100-200ml of a 20% Solution by IV over 10 minutes (caution: in Patient with renal failure)

If needed Albumin the dose is;

- **Inf. Albumin** IV bolus (1g/kg per day max 100 gram)

RX of Precipitating factors

HEPATORENEL SYNDROME (HRS)

Definition: It is characterized by the development of functional renal insufficiency in patient with severe liver failure, ascites or both due to hypo perfusion of kidneys.

Type 1 HRS: Serum creatinine >2.5 (50% ↓ Creatinine clearance) urine output <400 to 500ml/day

Type 2 HRS: Less severe than type 1, major C/F is Ascites that resistance to diuretics

Chief Complaint:

(Diagnostic criteria)

1) Chronic or acute liver disease with advanced liver failure and portal hypertension
2) Acute kidney injury, an increase serum creatinine > 0.3mg/dL within 48 hours, or an increase from baseline of > 50% within seven days
3) The absence of any other cause for AKI (Acute kidney injury) like shock, current or recent treatment with nephrotoxic drugs, and the absence of USG evidence of obstruction or parenchymal renal disease

Hx of medication; Diuretics, Nephrotoxic drug

Hx of Co-morbidity; DM, HTN, Chronic liver disease

O/E: Vital (Pulse, BP, Spo2%, Temp)

- Systemic examination
- Decrease urine output

Investigation:

1) RFTS, RBS, Serum Electrolyte
2) BUN level
3) LFTS
4) Neutrophil gelatinase-associated lipocalin (NGAL) levels are lower in Prerenal azotemia and hepatorenel syndrome
5) Ultrasound abdomen and pelvic

Rx: Date: Time:

- **Maintain AB (airway, breathing, circulation)**
- Bed rest, Pass Cather
- Terlipressin in combination with Albumin
- Stop diuretics and anti-hypertensive drugs
- **Inj. Terlipressin 1mg (Terlip)**
  IV bolus (1 to 2mg every 4 to 6 hours)
- **Inf. Albumin**
  IV bolus (1g/kg per day max 100 gram) for 2 days then followed by 25 to 50 gm per day until Terlipressin therapy is discontinued (2 week)

Alternate to Terlipressin:

1) **Tab Midodrine 7.5mg**
   1+1+1 (can increase up to 15mg TDS)
2) **Inj. Octreotide (Sandostatin)**
   50mg/hour IV continues infusion OR
   100 to 200mg S/C TDS

In ICU setup:

Inj. Norepinephrine
1 amp in 500ml IV @ 12 drops/min

Intervention:

- TIPS (Transjuglar intrahepatic post systemic shunt)
- **Liver transplant (ultimate therapy)**
- Dialysis can be initiated as a bridge to liver transplantation or liver recovery
- Long term prophylaxis for spontaneous bacterial peritonitis in patient with HRS
  Tab Norfloxacin 400mg (Noroxin) 1+0+0

WILSONS DISEASE (Hepatolenticular degeneration)

Definition: It is an autosomal recessive disorder caused by mutation in the ATP 7B gene (copper- transporting gene) lead to impair biliary copper excretion so copper accumulation occur in several organs like's liver, brain and cornea.

Chief complaint:

1. **Liver involvement**
   - Acute Hepatitis, Fulminant hepatic failure
   - Chronic hepatitis, cirrhosis with portal HTN
2. **CNS (At age of early twenties)**
   - Damage to basal ganglia; Dysarthria, dystonia,
   - Parkinsonism, tremors (BATWING Tremors),
   - Autonomic dysfunction, Seizures, memory loss
3. **Eye:** Kayser-Fleischer ring: best detected by Slit lamp examination.
   Some patients also have sunflower cataracts
4. **Other problems**
   - Behavioral abnormalities (depression, crying bouts, hyperactivity). Start 5years before diagnosis in nearly 50% of neuro-wilson cases.
   - Microscopic Hematuria, tubular damage, stones
   - skeletal - osteoporosis, osteoarthritis
   - Repeated Spontaneous abortions

O/E: Vitals, Hepatomegaly, Tremors, Seizures.

Investigation:

1) **Serum ceruloplasmin:** low in 85% Cases (<20 mg/dL): **Best initial test**
2) **24 hour urinary copper excreation:** ↑(most accurate)
3) **Liver Biopsy: Gold standard test**
4) **A Coombs -** negative hemolytic anemia
5) **CBC, RBS, Serum electrolyte**
6) **RFTS** (Rapidly progressive renal failure)
7) **Aminotransferases** (<2000 IU/L. the ratio of the AST + ALT is often >2)
8) **ALP:** normal or markedly subnormal (<40 IU/L)
9) **Serum uric Acid** (low uric Acid level)
10) **Serum Copper:** Elevated >100 mg/day.
11) **MRI, CT brain** (for neurologic Wilson disease)
12) **CSF: Cu^{++} in CSF;** neurologic Wilson disease

A Coagulopathy that is unresponsive to vit K

Rx: Date: Time:

- **Tab Penicillamine 250mg (Vitamin)**

Initial dose: 1.5-2g/day in divided doses
Maintenance dose: 0.7-1g
Titrate dose to maintain urinary copper excretion > 2 mg/day.

- **Tab Pyridoxine 25mg (Vita 6)**
  1+0+0

Alternate to D-Penicillamine or if
Patient unable to tolerate D-Penicillamine

Tab Trientine 250mg
Initial dose: 20 mg/kg/day in 2 or 3 divided doses
maintenance dose: 15 mg/kg in 2 or 3 divided doses
Max dose: Not exceed >1500mg / day

Others Treatment:

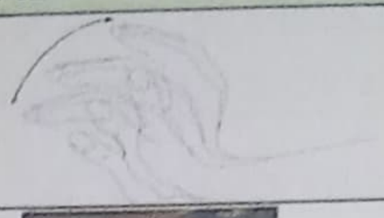
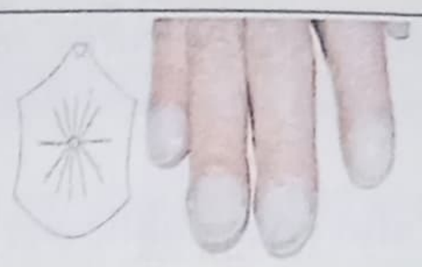
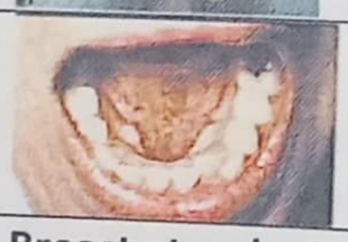
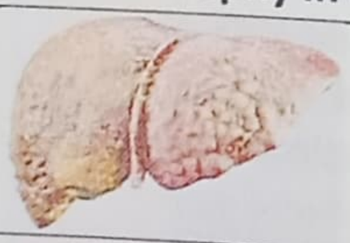
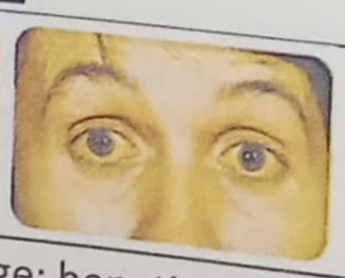
- **Tab Zinc salt 50mg**
  1+1+1 (2 hours before meal) – Continue
  (Interferes with absorption of copper)
  - ✓ Age < 15 year: 25mg 8th hourly,
  - ✓ Age > 15 year: 50mg 12 hourly

Neuro-Wilson's (Patient with neurological symptoms)

- **Tab Zinc salt 50mg**
  1+1+1 (2 hours before meal) - Continue
- **Tab Tetrathiomolybdate** 120mg/day

Diet: During the initial phase of treatment patients should avoid Consuming food with high Copper Content, in particular Shellfish, nuts, chocolate, mushroom & organ meats, Liver, brown rice, brown wheat

MNEMONIC FOR LIVER CELL FAILURE (Liver failure) Clinical Features

Remember "ABCDEFGHIJKLMN"		
A	**A; A**sterixis(Flapping tremors), **A**scites, **A**nasarca (Generalized edema), **A**trophy of testes	
B	**B; Bleeding tendency**; Ecchymosis, Purpura, Spider Naevi Spider naevi: vascular lesions consisting of central arteriole surrounded by many smaller vessels due to increase in Estradiol. It blanches on pressure	
C	**C; C**olour of nail (white color due to hypoalbuminemia), **Clubbing** (late C/F)& **Caput medusa**: Appearance of distended and engorged superficial epigastric veins which are seen radiating from umbilicus across the abdomen (seen in portal HTN)	
D	**Dupuytren's contracture;** Thickening & shortening of palmar fascia that leads to flexion deformities of little, ring fingers relatively common in alcoholic liver	
E	**E: Erythema;** Palmar erythema: due to alter sex hormones metabolism	
F	**F: Foetor hepaticus;** sweet pungent smell in breath due to increase methyl mecraptans due to severe portal-systemic shunting.	
G	**G; Gynaecomastia in male**	**Breast atrophy in female**
H	**H: Hepatomegaly** (alcoholism & hemochromatosis) /shrunken liver in viral cirrhosis or autoimmune cirrhosis	
I	**I; I**ncrease size of Parotid glad 2ndry to alcohol abuse & not cirrhosis of liver	
J	**J; J**aundice: Clinical Jaundice- S.bilirubin > 3 mg/dl Latent Jaundice – S.bilirubin 1 to 3 mg/dl	
K L	**K k**idney diseases; Hepato-renal syndrome **L: L**ow K^+, **L**ow Na^{++}, **L**ow Albumin	**M: M**ental change: hepatic encephalopathy **N: N**europathy – peripheral neuropathy

Endocrinology

DIABETES MELLITUS (TYPE 2)

INVESTIGATION:

TO Conform Diabetes:	Other Investigation:
• Random(causal) blood sugar : RBS • Fasting blood sugar: FBS • HBA1C • Oral glucose tolerance test (OGTT)	• Urine R/E (for protein, sugar, Ketone) • Full blood count (FBC) • Serum creatinine, lipid profile, SGPT, SGOT and TSH.

	FBS(Fasting blood glucose level)	2HPP(2hrs post prandial)	HBA1C
NORMAL	< 100 mg/dl	< 140 mg/dl	<5.7%
PRE-DIABETIC	100---125 mg/dl	140---199 mg/dl	5.7—6.4%
D.M	>126 mg/dl	>200 mg/dl	>6.5%

Symptoms of DM:

Classical	Non-classical
Polyuria	Weakness, fatigue
Polydipsia	Pruritus valvae, balanitis
Polyphagia	Recurrent UTI
Unexpected weight loss	Delayed wound healing, Headache, Nausea, blurring of vision

DIAGNOSIS: (WHO Criteria)

A) **In Asymptomatic patient any of the following**

1) FBS: ≥ 126 mg/dl (or ≥ 7.0 mmol/L) **2) RBS**: ≥ 200mg/dl (or ≥ 11 mmol/L)

3) 2 hour after 75g oral glucose tolerance test **OGTT**: ≥200mg/dl (or ≥ 11.1 mmol/L)

4) HBA1C: ≥ 6.5% (or ≥ 48mmol/mol)

B) **In Symptomatic patient:** the above criteria apply but two diagnostic tests are required to conform diabetes. (Two confirmatory samples on Separate Occasion, 2nd test should be the same as the first test).

❖ Once diabetes confirms then start Treatment (TX)

TREATMENT OF TYPE 2 DM:

HBA1C: < 9% : OR FBS: <11.1 mmol/L	**HBA1C: 9 to 10% OR FBS: 11.1 to <16.7 mmol/L**	**HBA1C: ≥ 10% OR FBS: ≥ 16.7 mmol/L**
Rx: Life style modification +Metformin Tab metformin 500mmg (Glucophage) 1+0+0 14 days Then 1+0+1 continue	Life style modification +metformin +2nd drug To add which one drug as 2nd drug depend on patients with other diseases factors see below.	RX; Start insulin Inj insulin 0.1to 0.3 U/kg body weight) S/C

Adding 2nd drug (which One) depend on patient with other disease factors e.g

1) Patient WITH ASCVD, CKD or Heart failure/heart patient or high risk for those.
   - ❖ **Tab Empagliflozin 10mg (Empaa, Xenglu, Elzafl)** 1+0+0 Continue **OR**
   - ❖ **Tab Linagliptine 5mg** 0+0+1 -Cont. (only if patient is not using GLP1 against) **OR Basal insulin**
2) Patients with Risk of Hypoglycemia
   - ❖ **Tab Linagliptine 5mg (Linvesta)** 0+0+1 continue **OR**
   - ❖ **Tab Empagliflozin 10mg (Empaa, Xenglu, Diampa)** 1+0+0 continue **OR** GLP1 against
3) In Patient to promote weight loss
   - ❖ **Tab Linagliptine 5mg (Linvesta)** 0+0+1 continue **OR**
   - ❖ **Tab Empagliflozin 10mg (Empaa, Xenglu, Diampa)** 1+0+0 continue **OR** GLP1 against
4) If cost (money) is issue
   - ❖ **Tab Gliclazide 30mg OR 60mg (DIAMICRON)** 1+0+0 continue before meal **OR** Thiazolidinedione's

FOLLOW UP:

- In case one drug: 2-4 weeks AND In case of insulin: 1 week
- HBA1C: Every 2 to 6 months until Stable then 6 monthly. Titration and adding drugs (only if needed)

Treatment Algorithm:

STEP 1: Weight Loss+ Exercise +Metformin (Up to maximum tolerable dose)

- **Tab Metformin** (Glucophage, Neophage) 500mg
  1+0+0 for 14 days then 1+0+1 continue with or without meal

Advice: Do HbA1C after 3 month

- If HBA1C <7% : continue same treatment
- If target is not achieved (or HbA1C ≥ 7%) Then move to step 2

Note: If Metformin contraindicated or cannot be tolerated then start SGLT 2 inhibitors, Dpp4 inhibitors, GLP1 agonist, or sulfonylureas

STEP 2 : Weight Loss+ Exercise +Metformin+ 2ND AGENT (Up to max tolerable dose) **COMBINATION;**

A) Metformin+ SGLT2 Inhibitors

Empagliflozin + Metformin Tab Diampa-M/ Xenglu Met/ Empagen-M **DOSE:** (5/500mg), (5/850mg), (5/1000mg), (12.5/500mg),(12.5/1000mg) BD with meal	**OR**	Dapagliflozin + Metformin **Tab Dapa-Met/ Xiga-Met** **Dose**: (5/850mg) (5/1000mg), (10/1000mg) 1+0+1 with meals

B) Metformin + DPP4 inhibitors

Sitagliptin + Metformin **Brand:** Tab Sita Met/ Sitaglu Met/ Sitagen-M/Inosita plus. **Dose:** (50/500mg), (50/850mg), (50/1000mg), (100/1000mg) **1+0+1 after meal OR**	**OR**	Vildagliptin + Metformin **Brand:** Tab Glavecta plus/ Vilget-M/ VildoMet. **Dose:** (50/500mg), (50/850mg), (50/1000mg) **1+0+1 with or just after meal**

C) Metformin + Sulfonylureas

Glimepiride + metformin **Brand:** Tab Getformin/ Orinase-Met/ EVOPRIDE Plus. **Dose:** (1/500mg), (2/500mg) **1+0+0** just before meal or with first meal of the day	**OR**	Glibenclamide + Metformin **Brand:** Tab Glucomet/ Glucovance. **Dose:** (1.25/250mg), (2.5/500mg), (5/500mg) 1 tab OD or BD after meal

D) Pioglitazone + Metformin: Brand: Piozer plus

Dose: (15/500mg), (15/850mg), 1+0+1 with meal

Advice: Do HbA1C after 3 month; If HBA1C <7% continue same TX

If target is not achieved (or HbA1C greater equal 7%) Then move to **Step 3**

STEP 3: If target not achieved (Glycemic target) then

1) Weight Loss + Consider triple Therapy (Metformin+ 2ND+ 3ND AGENT)

Use any combination from step2 + one other agent **OR Weight loss +metformin +insulin**

Advice: Do HbA1C after 3 month, If HBA1C < 7% continue same TX

If target is not achieved (or HbA1C greater equal 7% then move to **Step 4**

STEP 4: Weight loss +metformin +insulin +others

ANTI-DIABETIC MEDICATION WITH TRADE NAME, DOSES, SIDE EFFECT:

CLASS	DRUG	DOSE	SIDE EFFECTS
Biguanide (weight neutral)	**Metformin 500, 850, 1000mg** Brand **Glucophage, Glucophage XR, Neophage**	Regular tablet **Start** 500mg OD for 14 days Then 1+0+1 continue **Maximum dose:**2500mg/day **Extended release(XR) tablet** (500mg, 750 ,1000mg) Start 500mg OD, Increase by 500mg weekly Max dose: 2000mg/day	**1)**Abdominal discomfort, Anorexia 2) Lactic acidosis **3)** Less GI upset with extend release tablet Contraindication: **1)**Avoid if eGFR <45 and Creatinine >1.5 Contraindicated if eGFR <30 **2)**Impaired hepatic function **3)**Avoid in heart failure patient
Sulfonylurea (Insulin secretagogues) 1) Stimulate pancreatic cell to release insulin. 2) Reduce hepatic glucose release. 3) Increase the number of insulin receptors. **Note : Associated with weight gain**	**Gliclazide** 30, 60, 80mg Brand: **DIAMICRON Zaclazide**	**Start** with 30mg **Increase dose:** by every 2 week **Max dose,** 320mg **Taken** before meal	Hypoglycemia , **Weight gain** Contra in: Impaired hepatic and renal function.
	Glipizide 2.5mg , 5mg Brand: **Minidiab**	**Starting:** 2.5mg **Increase** by every 2 weeks **Max dose**: 40mg **Taken:** before meal >15mg needed give in divided doses	**Weight gain**
	Glimepiride 1, 2, 3, 4 mg Brand: **Evopride, Getryl, Amaryl**	**Starting dose:** 1mg **Increase by:** 2 week **Maximum:** 4 to 6 mg	**Weight gain**
	Glibenclamide (Glyburide) 2.5 mg , 5mg Brand:(Daonil)	**Start:** 2.5mg OD **Increase:** by every 2 months **Max:** 15mg in divided doses	**Weight gain**
Non-sulfonylurea Short acting Similar MOA of like sulfonylurea Mainly decrease PPBS	**Repaglinide (0.5, 1, 2 mg)** Brand: **Novonorm, REPAG,**	**Initial**: 2.5mg **Increase** by every 1 to two weeks **Max:** 12mg. Taken:15 minute before meal	Weight gain **Contra in:** Impaired hepatic, and renal function
	Nateglinide 60mg, 120mg Brand: **Glytan**	**Start:** 60mg **Increase** by every 1 to 2 weeks **Max:** 360mg, **Taken**: 15 mins before meal	

CLASS	DRUG	DOSE	Side effect
Thiazolidinedione's Reduce insulin Resistance by acting on PRAP receptor in adipose tissue Produce mild fluid retention & cause pedal edema	**Pioglitazone** **Brand:** **Piozer**	**Start:**15mg Increase by every 4 to 6 weeks **Max:** 45mg 1 dose	**Pedal edema**
	Rosiglitazone	**Start:** 4mg Increase by every 4 to 6 weeks **Max:** 8mg (1 to 2 doses)	**Pedal edema**
Alpha glycosidase inhibitors Decrease post prandial glucose by decreasing glucose absorption at intestine Weight friendly	Acarbose **25,50 mg**	**Starting**: 25mg TDS Increase by every 6 weeks **Max:** 150mg/day if weight ≤ 60kg. And 300mg/day if weight > 60kg give in divided dose. **Taken:** within meal	GI upset Contra in: Impaired hepatic function eGFR less than 30 Inflammatory bowel diseases Malabsorption states
	Miglitol **25,50mg**	**Starting**: 25mg TDS Increase by every 6 weeks **Max**: 50 to 100mg TDS **Taken**: within meal	
	Voglibose	**Starting:** 0.2mg (OD or TDS) Increase by every 6 week **Max:** 0.9mg (in 3 doses)	
Incretins Amplify glucose Stimulation insulin secretion Either act as activity **DPP4 inhibitors :** **(Gliptin)** Reduce pre and post prandial glucose level **GLP1 analog:** **(Exanatide)** Analog of GLP1 Reduce post prandial glucagon release Slowed gastric emptying	**Sitagliptin** **25,50,100mg** **Brand:** **Sita, Trevia, Sitagen**	**Starting:** 100mg OD Available in combination with metformin. **Taken:** with meals	GI upset, Upper RTI Acute pancreatitis Contra in: Gliptin Impaired renal, function, except Linagliptine
	Vildagliptin **Brand: Vilget Galvecta**	**Starting** 50mg BD Available in combination with metformin.	**Avoid:** if 1)eGFR < 60 2)ALT/AST 3 times upper normal limit
	Linagliptin 5mg	**Start** 5mg OD	**Note:** Linagliptin No dose adjustment is requires in renal impairment.
	Exanatide 5mcg	Starting: 5mcg BD P/O 60 minutes before breakfast or dinner. Maximum increase to 10mcg. BD after 1 month.	
	Liraglutide 0.6mg	**Start:** 0.6mg S/C Od for 1 week. Increase to 1.2mg S/C OD if glycemic control not achieved. **Max**: 1.8 S/C OD.	

CLASS	DRUG	DOSE	Side effect
SGLT2 inhibitors Reversible inhibit Na+ glucose cotransporter 2 (SGLT 2) in renal proximal convoluted tubules to reduce glucose reabsorption &↑ urinary glucose excretion.	**Empagliflozin 10,25mg Brand: Empaa, Xenglu, Diampa)**	**Starting:** 10mg OD **Maximum** 25mg	Genital infection UTI (secondary to glycosuria) Silent DKA
	Dapagliflozin 5,10mg Brand: Dapa, Dapaglu	10mg OD	
	Canagliflozin 100,300mg	**Starting**: 100mg OD **Max:** 300mg OD If eGFR normal	**Avoid** if eGFR <45ml/min

Target of treatment:

Glucose level	**FBS**: 90 to 130mg/dl (5 to 7.2mmol/L). **HBA1C**: <7% **Post meal**: 1 hour peak <180mg/dl (<10mmol/L) 2 hour peak <150mg/dl (<8.3 mmol/L)
Lipid profiles	**HDL** >40mg/dl (male) HDL >50mg/dl (female) **LDL**: <70mg/dl **TAG**: <150mg/dl
Blood pressure	**BP**: <140/90 mmHg
BMI	BMI <23kg/m², Waist circumstance: < 90cm in male, < 80 cm in females

Life style modification in Diabetes (Type2)

- Quit smoking
- Exercise: Aerobic exercise: 150 mins or more moderator to vigorous intensity aerobic exercise per week. Daily exercise or not more than two days elapse between exercise sessions is recommended and spread over at least days per week. Aerobic activity last at least 10 minutes with the goal of 30 minutes or more per day.
- Resistance activities: 2 to 3 Sessions per week nonconsecutive days for example push up pull up weight lifting etc.
- Breaking up bouts of sedentary activity: Every 30 minutes by briefly standing walking or performing other light activities. But
- Daily 60 minutes or more exercise: AND To weight loss in overweight or obese patients.
- DMI (Kg/m²)
  - ✓ **Normal:** 18.5-24.9 & **Overweight:** 25-29.9 & **Obesity class I**: 30-34.9
  - ✓ **Obesity class II** :35-39.9 & **Obesity class III** : >40 (Morbid obesity)

TX Of Complications:

Diabetic neuropathy (Peripheral neuropathy)

Chief Complaint:

- Pain full diabetic peripheral neuropathy
- Burning sensation in gloves & stocking pattern

Rx: **Date:** **Time:**

1) **Cap Duloxetine 60mg (Dulan, Lyta, Dultix DR)** 1+0+0 (upto120 mg/day) Alternate for duloxetine is; **Cap Pregabalin 25,50, 75, 100 mg (Zeegap, GABICA)** 0+0+1 (can increase up to 300)until desired affect
2) **Tab Amitriptyline 25 (Amyline)** 0+0+1 (25 to 100mg/day) for 3months to 1 year **OR**
3) **Tab Nortriptyline+Fluphenzine 0.5/10mg (Motival)** 1+1+1 **Tab Mecobalamin 500mcg(neurometa)** BD-1 months **OR** **Tab ADN6** (Vit B1,B6, B9, B12, E, Oryzanol) OD- 1 month
4) Optimal glycemic control

Gastroparesis (Delayed gastric emptying)

Chief complaints:
- Early satiety, Indigestion,
- Regurgitation (GERD)
- Bloating and vomiting

Rx: **Date:** **Time:**
Prokinetics(metoclopramide or erythromycin)
Tab Metoclopramide 10mg (Maxolon, Metomide) 1+1+1 **OR**
Tab Erythromycin 250mg (Erythrocin) 1+1+1

Diabetic Retinopathy: Eye Examination by ophthalmoscopy at DX of diabetes and then once a year in type 2 DM.
1) If evidence of Retinopathy Maintain HBA1C <7%, BP <130/80 mmHg,
2) Refer to ophthalmologist if retinopathy is beyond NPDR

Diabetic Nephropathy: RFTS, Urinary albumin & serum creatinine at diagnosis and once yearly
1) If evidence of nephropathy : Maintain HBA1C <7%, Maintain BP <130/80 mmHg,
2) Refer to Nephrologist: if CKD in stage 4 or rapidly declining renal function

Impotence: (Sildenafil, or Tadalafil) Tab Tadalafil 5mg 1 tab 1 hour before sexual intercourse
- Multivitamins (or tonic) **or** Tab SUPRAUIT-M 1 tab daily 2 month

Dyslipidemia:
1) If LDL ≥70mg/dL: **Tab Atorvastatin 20mg** (Lipiget,TRUVA) 0+0+1 at night
2) If TG ≥500mg/dL: **Cap Fenofibrate 200mg** (Fenoget) 0+0+1 at night

Types of insulin

Preparation	Onset	Peak	Duration	Time with meal
1) **Short acting insulin analogues**. Analogue insulin is laboratory grown (Synthetic) but altered to create either a more rapid acting or more uniformly acting form of the insulin. Absorbed quickly from fat tissue (Subcutaneous) into blood stream: used to control blood sugar during meals, snacks & correct high blood sugar.				
Lispro, Aspart Glulisine(Analogues)	5-15minutes	30-90minutes (Hyperglycemia can occur)	3-4 hours	With meal: within 15min Before or after meal
2) **Short acting regular insulin** (human insulin) Is the name which describe synthetic insulin which is laboratory ground to mimic the insulin inhuman.(short acting soluble crystalline ZINC Insulin)				
Regular insulin	30 minutes	2 to 3 hours	6 to 8 hrs	30 mins before meal S/C
3) **Intermediate acting insulin**. Absorbed slowly and last longer.				
NPH	2 to 4 hours	6 to 7 hours	10 -16 hours	30 minutes before meal
LENTE	3 to 4 hours	6 to 12 hours	12-18 hours	30 minutes before meal
4) **Long acting insulin**- slowly absorbed, minimal peak effect, stable plateau effect, last most of the day. Used to control blood sugar overnight; while fasting and between meals				
Ultralente	6-10 hours	10 to 16 hours	18 -24 hours	No specific time
Glargibe(analogue)	2 to 4 hours	Minimal	24 hours	No specific time
Detemir(analogue)	2 to 4 hours	Minimal	17 hours	No specific time
5) **Ultra long acting delude**	30 - 90 mins	40+ hours		
6) **Premixed insulin**	Short acting + intermediate acting insulin in fixed proportion i.e. 30/70, 25/75, 50/50, (R insulin/ NPH) 30/70=30% short acting (i.e. R insulin), 70% intermediate acting (NPH)			

NPH (Neutral protamine Hagedorn or isophane)

Indication of insulin: **A)** Type1 diabetes**)** Type2 diabetes: If **i)** Severe acute illness or complication **ii)** Oral anti-diabetic (non-insulin agent) failure III**)** adverse effect of oral anti-diabetic. **IV)** HBA1C ≥10%. **C)** Pregnancy, lactation. **D)** Very high blood glucose **E)** Uncompensated chronic illness or complication. **F)** Major surgery and hospital setting
Dose: 0.5 to 0.7unit/kg/day as initial dose; adjust accordingly (increase or decrease)

INSULIN DOSE:

A) **Basal insulin** (to be added to oral agents)
Start: with one dose at bed time
Dose: 0.1 to 0.2 units/kg/day
Increase: By 2 units every 2nd day until FBS is in range of 90 to 130mg/dL

B) **Premixed Insulin:**
Start: with one before breakfast, 2nd dose before dinner
Dosage: 0.2 to 0.4 units/kg/day (2/3 in morning, 1/3 in evening)
Increase: Morning dose by 2 units every day if pre-dinner blood sugar high & vice versa

C) **Basal/ Bolus insulin before meal:**
Dose: 0.3 to 0.5mg/kg/day but mostly we take **0.5mg/kg/day**
40% basal insulin , 60% bolus (to given in divided dose TDS before meals)

Insulin Analogs:

- **Insulin Aspart** should be given immediately before a meal (start of meal within 5-10 minutes after injection) because of its fast onset of action.
- **Insulin Lispro** should be injected immediately prior to eating (or less than 15 minutes before the meal).
- **Insulin Glulisine** should be administered within 15 minutes before or within 20 minutes after starting a meal.
- **Insulin Detemir** is indicated once or twice-daily S/C for the patients with diabetes mellitus who require basal (long acting) insulin for the control of hyperglycemia.
- For patients treated with Detemir once-daily, the dose should be administered with the evening meal or at bedtime.
  For patients who require twice-daily dosing, the evening dose can be administered either with the evening meal, at bedtime, or 12 hours after the morning dose.
- **Insulin Glargine** is a recombinant human insulin analog that is a long-acting (up to 24-hour duration of action).
  Insulin Glargine at bedtime and rapid-acting insulin at mealtimes is a good regimen to simulate physiologic insulin secretion.
- **Insulin Degludec** injection is also a long-acting basal human insulin analog for subcutaneous injection.
- **Inhaled insulin** was recently approved. It should be given 10 minutes before meals. The insulin is available in 1mg & 3mg packs (1mg is equivalent to approximately 2.5 to 3.0 units of injectable insulin).

HYPOGLYCEMIA

Definition: It is a clinical syndrome characterized by low plasma glucose level, symptomatic sympathetic nervous system stimulation and CNS dysfunction. It occurs when blood glucose < 60mg/dL

Chief Complaint:

1.Neurogenic (adrenergic/autonomic activity)

- Sweating, palpitation, tachycardia, anxiety, tremors due to insufficient glucose supply to the brain, Dizziness, headache, clouding of vision, confusion, Convulsion.

2.Nocturnal hypoglycemia episode: are usually asymptomatic but patient will give History of night sweat, poor sleep, morning headaches, hangover, nightmares restlessness, muscle twitching or even convulsion can occur

3. Hypoglycemia unawareness:
When Someone doesn't experience or perceive the symptoms of hypoglycemia.

- **Beta blocker can mask the adrenergic symptoms of hypoglycemia.** SSRI used to treat depression may also have this effect

Drug Hx: Insulin, sulfonylurea, Anti-malarial (Quinine)

O/E: Vital (BP, pulse, Spo2%, temp,) GCS, Pupil

- Plantar: B/L extensor, wet & sweet skin

Investigation:

1) **RBS** (blood sugar level
   < 60mg/dL in non-diabetic and
   < 70mg/dL in diabetic patient
2) **In spontaneous hypoglycemia**
- Serum Insulin. FBS , C-Peptide level
3) **CBC with Malarial parasite, ESR.**

Spontaneous hypoglycemia:

Hypoglycemia occurs in non-diabetic Patient is called spontaneous hypoglycemia causes are!

- Alcohol, malaria, sepsis.
- Drug: Quinine, disopyramide, Gatifloxacin, salicylates
- Non islet Cells tumors (insulinomas) Hypopituitarism

Rx: **Date:** **Time:**

A) If patient is conscious & able to swallow

Oral glucose as drink or sweets
15-20g of sugar (e.g 3 TSF sugar OR any carbohydrate rich food like 3 average size biscuits, 6-8 chips, etc. & 4 dates, fruit juices

B) If Patient is semiconscious or unconscious

- **Inj. Hypertonic** 6 ampule IV Stat
  Inf. 5% dextrose 50 ml or 10% dextrose 150ml IV continuous (over 20mins)
- If cant established IV access then
  Inj. Glucagon 1mg I/M or S/C stat. it can produce marked nausea or vomiting so can also give Inj. Metomide 10mg IV Stat

C) Sulfonyl-Urea caused hypoglycemia may be long lasting or recurrent since the effects of sulfonylurea may continue to stimulate insulin secretion so Treatment for at least for 24 hours.

- **Inf. 5% dextrose** 1L IV @ 15 drops /min for 24hour maximum can give up to 48hours AND Same Treatment for patient who taken long acting insulin.

D) Repeat: Capillary glucose measurement (RBS) 15 minutes later

✓ If still <60mg/dL; Repeat above tretament
✓ If >60mg/dl; advice to take meal/ dates.

E) In case of unexplained hypoglycemia

➢ Reduce 10-20% of current insulin doses.
➢ If patient taking sulfonylurea; if no predisposing factors found, hold the drug for 24 hour.

Differential diagnosis (DDS) of hypoglycemia remember "INSULINOMA"

- **I:** Insulin, Insulinomas, **N:** Non-insulinomas pancreatogenous hypoglycemia syndrome
- **S:** Sepsis, **U:** Uremia (Renal failure), **L:** Liver failure
- **I:** Insulin antibodies syndrome (seen in Japanese people)
- **N:** Nutritional (prolong fasting) **O:** Oral hypoglycemia agent (e.g sulphonyl urea)
- **M:** Malaria (and quinine therapy for malaria) **A:** Adrenal insufficiency

Whipple trade:

1) Symptoms of hypoglycemia **2)** Hypoglycemia (blood glucose level <50mg /dl)
3) Relief of symptoms following ingestion of glucose.

Prevention of hypoglycemia

1. Determine cause of hypoglycemia (Missed, inadequate or delayed meal)
   Other; unexpected and unusual exercise, error in drug administration)
2. Education: Educate about symptoms of hypoglycemia & immediate treatment of hypoglycemia
3. Educate about the causes of hypoglycemia.

Reactive Hypoglycemia; Following gastrostomy is due to hyper-insulinism resulting from rapid gastric emptying of inserted food

Pseudo hypoglycemia; Occurs during processing of blood samples in untreated test tubes is delayed and cells, like RBCs and leukocytes (especially if elevated, as in leukemia or polycythemia) consume glucose.

Hypoglycemia VS Hyperglycemia

Features	Hypoglycemic coma	Hyperglycemic coma
History of	Decreased food intake	Too little or no insulin and infection / fever
Symptoms/sign	Sweating, Palpitation Moist skin, mouth.& Normal pulse, normal BP, breathing	1)Dehydration, oliguria, thirst, week pulse 2)Low BP, kussmaul's breathing 3)Dry skin and mouth
Blood	Low sugar, pH normal	High sugar, PH low
Urine	No ketones	Ketone present

SOMAGYI PHENOMENON:

Somagyi phenomenon/Post hypoglycemic hyperglycemia or Rebound hyperglycemia occur following a hypoglycemia episode due to counter regulatory hormone release.

- ➢ It manifest as night (3 am) Hypoglycemia and morning (8am) Hyperglycemia
- ➢ The diagnosis can be confirmed by a low 3 am blood glucose and a high morning blood glucose level
- ❖ Treatment: Reduce the night time insulin dose

DAWN PHENOMENON:

Dawn phenomenon is clinically resemble Somagyi phenomenon but here there will be fasting Hyperglycemia (morning hyperglycemia) but no night Hypoglycemia

- ➢ It manifest as night (3am) Hyperglycemia & also morning Hyperglycemia
- ❖ Treatment: Increase the dose of night time long acting Insulin

Hypoglycemia in Diabetes: Hypoglycemia is a common complication in diabetic patient mainly in those treated with Insulin, Sulfonylurea, or glinide.

- ➢ **Level 1 Hypoglycemia**: Plasma glucose concentration < 70 mg/dL but > 54 mg/dL
- ➢ **Level 2 hypoglycemia**: Plasma glucose concentration < 54 mg/dL requiring immediate intervention to correct the Hypoglycemia
- ➢ **Level 3 Hypoglycemia**: Serious event characterized by a change in the mental status or impairment in the Patients Physical ability to function that requires intervention by another person to corrects the glucose concentration

COUNTERREGULATORY HORMONES: Glucagon, adrenaline (epinephrine), Cortisol & Growth hormone are released during hypoglycemia and other stress condition

- ➢ **Glucagon:** It acts on Liver to stimulate Glycogenolysis and Gluconeogenesis and is probably the earliest & most important hormones in the Somogyi phenomenon
- ➢ **Epinephrine:** It decreases the release of Insulin, Stimulates glucagon release, Inhibits glucose utilization by several tissues, and stimulates a warning system or Symptoms of hypoglycemia
- ➢ **Cortisol:** May aid in prolong and severe cases of Somogyi Phenomenon by blocking glucose use and stimulating hepatic glucose output
- ➢ **Growth hormone:** similar action like Cortisol

DIABETIC KETOACIDOSIS (DKA)

Chief Complaint:

- Polyuria, thirst, weakness, nausea, vomiting
- Blurred vision, Leg cramps
- Abdominal pain, headache
- Confusion, drowsiness, Coma (10%)

Hx of omission of insulin therapy or
Co-existing illness in type 1 and type 2 DM

O/E:

- Vitals (Pulse, BP. Spo2%, Temp, RR)
- Major finding: Hypotension, Tachycardia, Severe dehydration
- BP: Hypotension (indicates loss of 10% of body fluid)
- Kussmaul's breathing (air hunger): deep, regular, rapid, Sighing respiration
- Smell of acetone (Acetone breath)
- Hypothermia in many patient
- Cold extremities / Peripheral cyanosis
- Evidence of dehydration in stuporous patient with Kussmaul's breathing strongly diagnostic for DKA

Investigation:

1) **RBS** (>250mg/dL)
2) **CBC** (TLC elevated in Sepsis /infection)
3) **Ketone bodies**-urine and blood for Ketones, **urine for ketone**: > 2+
4) **ABG:** To access Severity & Conform DKA) (PH: <7.3, HCO_3: <15 mEq/L)
5) **Serum urea** (↑ due to dehydration or RF)
6) **Serum Creatinine** (↑ in Renal failure)
7) **Serum Electrolyte** (Na^{++} decrease due to hyperglycemia) for each 100mg/dL rise in glucose cause 1.6 mEq/L reduction in Na^{++}
8) **ECG** (Rule out MI, electrolyte imbalance)
9) If infection Suspected then
   CBC, blood & urine culture, CRP, CXR
10) **If pancreatitis is suspected:** In DKA the amylase is usually of salivary origin and thus is not diagnostic of pancreatitis. So, we advise: **Serum Lipase**

Rx: **Date:** **Time:**

- Pass Catheter if no urine passed after 3hour
- Change Posture 2 hourly if unconscious
- Diet: NPO (No per oral)
- Pass 2 IV line (With 3-way stopcock if available)

❖ **Fluid (initial TX of choice is Rehydration as 0.9%. NS)**

Inf NS IL IV @500 drops / min (or over 30 min)
Then
Inf NS IL IV @ 250 drops/min (or over 1hours)
Then
Inf NS IL IV @ 125 drops/min (or over 2hours)
Then
Inf NS IL IV @ 125 drops/min (or over 2hours)
Then
Inf NS IL IV @ 60 drops/min (or over 4 hours)
Then
Inf NS IL IV @ 40 drops/min (or over 6 hours)

❖ **Check RBS hourly:**

If RBS < 250 mg/dL Switch to Inf. Dextrose saline 5% IL IV @500 drops / min

If still dehydrated, Continue NS & add 5% dextrose IL Per 12 hr

INSULIN Ⓡ: (Protocol 1 **OR** 2)

IF K^+ <3.5 correct K^+ first to >3.5meq/L then START Insulin with protocol 1 or 2

1) **Inj. Insulin** Ⓡ 60 units + 100 ml NS IV @0.1units/kg/hr (10drops/min) **OR**
2) **Inj Insulin** Ⓡ 0.1unit/kg IM hourly
   (e.g Patient weight 60 kg : so dose to be given 0.1x60= 6 unit so 6 unit IM hourly)

Note: Better to follow protocol 2 (IM hourly)

Potassium Correction:

- Check Serum electrolyte 2 hourly

If Serum K^+ < 3.5 mEq/L: (give 40mEq/L Potassium)

- **Inj. KCL 2 amp + 1000 ml NS**
  IV @75 drops/min or 300 ml/hour

If Serum K^+ 3.5-5.0 mEq/L :(give 20mEq/L Potassium)

- **Inj. KCL 1 amp + 500ml NS** IV @ 30 drops/min

[**Maintain Serum k^+** at 4 to 5 mEq/L]

If infection Suspected then add: Inj. ceftriaxone 1gm (Oxidil, Rocephin) 1 vial IV stat & BD

Mg & Phosphate correction if needed

MONITOR: Check **RBS: hourly**, Serum **electrolyte: 2 hourly** and **ABG: 4 hourly**

Bicarbonate therapy: Not routinely recommend and use is Controversial may be useful & should be recommended in DKA patients with

- ❖ Shock or coma **or** severe acidosis (pH <7.0) **or** Severe hyperkalemia **or**
- ❖ Acidosis-induce Cardiac or respiratory dysfunction

Blood Sugar:

- ❖ Check blood sugar hourly - if no reduction in 1st hour (10% or 50-75 mg/dl/hr), rate of insulin infusion should be doubled & repeat it every hour until a good response is seen.
- ❖ A decrease in blood sugar of 50 - 75 mg/dL/hr is an appropriate response; lesser reduction suggests insulin resistance, inadequate volume repletion, or a problem with insulin delivery / insulin brand.

Delta gap: Delta gap = (Anion Gap - 10)/(24 - $HCO3^-$) [AG= Anion Gap]

- ❖ A value <1 indicates: mixed metabolic acidosis (a non-AG acidosis & high-AG acidosis).
- ❖ A value > 1.6 indicates: mixed metabolic acidosis and metabolic alkalosis.

The osmotic gap (also called osmolal gap) normally less than 10-15 mOsmol/kg.

Plasma Osmolality = 2 x Na + glucose(mg/dL) / 18 + BUN(mg/dL) / 2.8 BUN= 2.14 x blood urea
Normal Plasma Osmolality= 275-290 mOsm/Kg
Osmolol gap (OG) = measured serum osmolality (from lab) - calculated osmolality (from other investigation values)

Anion gap:

- Anion gap (AG) = $(Na^+ + K^+) - (Cl^- + HCo3^-)$
- Normal Value: 8-12
- High anion gap Acidosis: DKA, Starvation, lactic acidosis, Aspirin poisoning, methanol & ethylene poisoning

Transition from IV to S/C Insulin

1. With known diabetes who are on basal insulin Simply Continue their basal insulin in same dose during Rx of DKA
2. Those who are on oral or newly. diagnosed diabetes

- Calculate the amount of insulin added in previous 8 hour
- Half is given as basal and half premeal (bolus)

Note: Give first dose of S/C basal and S/C bolus insulin While Continue IV insulin till 1 hour after which IV insulin infusion should be stopped

Remember management of DKA "ABCDEFGHIJK

- ❖ **ABC** (airway, breathing, circulation)
- ❖ **D**iabetic history and Blood sugar values to be taken
- ❖ **E**lectrolytes (K+) and pH (ABG) **F**luid management – IV Fluids (NS)
- ❖ **G**lucose monitoring hourly -With glucometer
- ❖ **H**ypokalemia to be managed, **H**ypoglycemia to be looked for
- ❖ **I**nsulin infusion, 0.1unit / kg/hour
- ❖ **J**ugular venous pressure to be monitored in patients with fluid overload
- ❖ **K**etone bodies to be observed(negative) to stop insulin infusion

Complication of DKA:

- ❖ Lactic Acidosis, Cerebral edema, Acute respiratory distress syndrome (ARDS)
- ❖ Arterial thrombosis (stroke, MI, ischemic limb)
- ❖ Venous thromboembolism/ DIC (rare), Acute Circulatory failure / shock
- ❖ Rebound ketoacidosis can occur due to premature cessation of insulin therapy

DKA (Diabetic Ketoacidosis): A State of absolute or relative insulin deficiency aggravated by hyperglycemia, dehydration and acidosis producing derangements in intermediary metabolism

D: Diabetes (RBS >250mg/dL), **D**ehydration (Loss of >10% of body fluid)

K: Ketone bodies (urine for ketone and blood for ketone)

A: Acidosis (PH <7.3 with bicarbonate"HCO3" <15 mEq/L)

: **A**ssociated with nausea, vomiting, **A**bdominal pain, electrolyte imbalance, Kussmaul's breathing, **A**cetone breath

Causes;
- Infection especially pneumonia, Urinary tract infection and sepsis
- Inadequate insulin treatment or non-compliance
- Infarction (Cerebral stroke, MI). stress, illness pregnancy & alcohol intake

Deficit:

Fluid deficit: 6L (100ml/kg body weight); due to hyperglycemia which cause Polyurea "osmotic diuresis"

Na++ deficit: 7 to 1o mEq/kg body weight: (l00mg/dL ↑ glucose cause 1.6 mEq ↓ in Serum Na++

K+ deficit: 3 to 5 mEq/kg (or total 500 to 700 mEq)

Despite the total body K+ deficit, the serum k+ is usually normal or in about 1/3 cases elevated at presentation due to Insulin deficiency and Hyper osmolality, both of which cause k+ shift out of cell

During rehydration & insulin therapy, serum k+ drops rapidly as K+ re-enter into cell

Phosphate deficit: 5-7 mEq/kg, Mg++ deficit: 1-2 mEq/kg, Calcium deficit: 1-2 mEq/kg8*+

Fluid management:

- 0.9% NS IV infused at 4 -14ml/kg/hr
- 6L in first day and should be based on clinical response & urine output
- Continued until Fluid intake /output records indicate a + fluid balance
- Monitor for fluid overload in elderly & Heart failure Patient

Note: Serum Sodium can increase as hyperglycemia is corrected; failure to see this suggest that Patient is fluid overload with free water

When to say Patient is out of DKA

1) ABGS – normal.
2) Patient is awake.
3) Patient is able to eat

How to manage Hypoglycemia during DKA treatment:

If blood glucose 50mg/dl
↓
Stop insulin infusion & administer 1 amp (25g) Dextrose 50% IV Stat
↓
Recheck blood glucose every 15 min until Blood glucose > 90mg/dl
↓
Recheck blood glucose every 1 hour
↓
When > 140mg/dl wait 30 min then Restart insulin infusion at 50% of most recent rate

If blood glucose 50-74 mg/dl
↓
Stop insulin infusion & administer 1/2 amp (12.5g) Dextrose 50% IV Stat

If blood glucose 75-99mg/dl
↓
Stop insulin infusion
↓
Recheck blood glucose every 15 min until reaches or remains > 90mg/dl
↓
Then recheck every 1 hourly when > 140mg/dl
↓
wait 30 mins then
↓
Restart insulin infusion at 75% of most recent rate

Hyperglycemic Hyperosmolar State (HHS)

Also called "nonketotic Hyperosmolar coma" (HONK). Relative insulin deficiency & inadequate fluid intake are the underlying cause. Insulin Deficiency is only relative & less severe than DKA.

Chief complaint:

- Altered conscious level, Gradual onset of weakness, Polyurea, Polydipsia.
- No features of DKA (i.e. kussmal breathing, vomiting)

Past Hx: Diabetes, any infection, MI, CVD, RF

Drug Hx: Glucocorticoids, insulin

Main features:

- Hyperglycemia >600mg/dl (33.3 mmol/L)
- Hyperosmolarity >310mosm/kg)
- Severe dehydration with pre-renal uremia.
- No acidosis: PH>7.3, HCO3 > 15 mEq/L
- Normal anion Gap (<14 mEq/L)

O/E:

Pulse: Tachycardia, BP: hypertension, GCS: ↓, Dehydration ++, Acetone breath: Negative

Investigation:

1) **RBS:** (600 to 1100 mg/dl)
2) **Serum electrolyte** (Hyponatremia)
3) **Urine for ketone**
4) **ABG:** (PH > 7.3, HCO3 > 15mmol/L)
5) **Serum urea**: (Elevated)
6) **CBC and blood culture, CXR** (PA view)

Input output record.

Stop fluid therapy:

when urine output ≥ 50ml/h

Rx **Date:** **Time:**

Bed rest: Change posture 2 hourly if unconscious.

Diet: Avoid glucose containing food

Fluid: if hypovolemia (low BP, low urine output) start with NS 0.9%. in all other cases NS 0.45% is Preferable as initial fluid of replacement

- **Inf NS 1L** IV @250 drops/min (over 1 hour)

Then

Inf NS 3L IV @ 60 drops/min (over 12 hour)

Then

Inf NS 2L IV @ 30drops/min (over 12-24 hours)

INSULIN: (DOSE: 0.05mg/kg/hour)

- **Inf NS 100ml + inj. Insulin ®** IV @ 20 unit

(weight in Kg ÷ 2) micro drops/min Continue

When patient is able to eat & stable biochemically or blood glucose falls to 250mg/dL, Insulin can be given subcutaneously

If infection is suspected then: add

- **Inj. Ceftriaxone 1gm (0xidil)** IV BD (After test dose)

When Glucose ≤ 250mg/dL :

Add 5% dextrose with NS (0.45% or 0.9%)

- **Inf 5 % dextrose** 1L IV @ 60drops/min (125mL/hr)

Plasma Osmolality (PO)

= 2 (Na) + (Glucose/18) + (BUN/2.8)

Normal: 280-300mmol/dl (BUN= 2.14 x Urea)

Confusion develop at: osmolality > 310mosm/kg

Convulsion & coma at: osmolality >320 to 330

	DKA	HHS
Blood sugar (mg/dl)	250 to 600	600 to 1200
Serum sodium (mEq/L)	125 to 135	135 to 145 (or > 145)
Blood urea, creatinine	Mild increase	Moderate increase
Serum Osmolality	300 to 320	330 to 380
Plasma ketones	++++	-/+
Serum bicarbonate	Low	Normal
Blood pH	Low (acidosis)	Normal
Anion Gap	High anion Gap	Normal
Insulin requirements	High	Low

HYPOTHYROIDSM

Definition: - A condition that occurs when thyroid gland does not produce enough thyroid hormones.
5 to 8 time more common in women than men.
Primary: Thyroid gland disorder **Secondary:** Pituitary / hypothalamus disorder.
Autoimmune (Hashimoto) Thyroiditis is the most common cause of hypothyroidism

Chief Complaint:

- Cold intolerance, Weight gain
- Menorrhagia , Depression, Constipation
- Dry skin (most common features) and dry hair
- Carpal tunnel syndrome (delayed relaxation of reflexes)

O/E :

- Vitals (Pulse, BP, Spo2%, Temp)
- Pulse: bradycardia
- Edema :non pitting & Periorbital edema
- Husky voice and Goiter in some patient
- Ankle jerk: delayed relaxation

Investigation:

1) **TSH:** (measure any time of day without fasting): ↑
2) **T3, T4: Decrease**
3) **ECG:** sinus bradycardia low voltage ECG
4) **Thyroid scan**
5) **TPO** (thyroid peroxidase anti-body)

➢ **Only TSH is enough to make a diagnosis of hypothyroidism**

Subclinical hypothyroidism:

- TSH raised but T3,T4 normal
- No obvious symptom

Treat Subclinical hypothyroidism:

- TSH >10
- Thyroid auto antibodies: +
- Other autoimmune disorders
- Previous treatment of graves

Pender's syndrome:
Autosomal recessive disorder of defective iodine.
Goiter with eudthyroidism or mild hypothyroidism
Sensor neural deafness

Rx: **Date:** **Time:**

Levothyroxine:

- **Dose:** 1.6 mcg /kg /day
- **Brand:** Thyronorm:
  25mcg, 50mcg, 75mcg, 100mcg
- **Taken:** 30 minutes before breakfast
- **Increase dose:** Every 1 to 3 weeks until Patient become euthyroid
- **Advice:** TSH every 3 months

Note: Iron reduce the absorption of thyroxin

➢ **Tab Levothyroxine 50 mcg (Thyronorm)**
1+0+0+ 30 min before breakfast for 3 Week then
Tab Levothyroxine 50 mcg (Thyronorm)
2+0+0 30 min before breakfast for-3 weeks increase the does in every 3 week until TSH, FT4 is within normal limit

❖ **In young healthy adult starting dose:**
100 mcg /day

❖ **In IHD patient** or age more than 60 years
Start smaller dose 25 to 50 mcg daily dose

❖ **In pregnancy :** Increase the dose
i.e. add 25mcg with previous dose

Pregnancy thyroid problem :

➢ Two fold increase in level of thyroxin binding globulin(↑TBG) so cause increase in total thyroxin T4 level but doesn't affect the free thyroxin level

- Normal TSH, normal free T3, normal free T4
- High total T3, High total T4 (due to ↑ TBG)

MYXEDEMA COMA

Definition: Is defined as severe hypothyroidism leading to decreased mental status, hypothermia and other symptoms related to multiple organ dysfunction. Mainly occur in elderly or patient with infections (no fever), Pneumonia, Congestive cardiac failure , MI, GI bleed, Cerebral vascular diseases , or drug induce (sedatives)

Chief Complaint:

- Reduce level of consciousness
- Seizures, convulsion

H/O: Hypothyroidism, radioiodine therapy thyroid surgery, infection, MI,CVA, trauma

Drug Hx: drugs induce

O/E:

- Vitals (BP, pulse, SpO2%, temp,)
- Appearance: myxedematous
- BP: hypotension, PULSE: bradycardia
- Temperature : <95F°(or low as 25c°)
- Hypothermia, hypoglycemia, and hypoventilation with respiratory acidosis
- Hyponatremia (50%), Cyanosis

Investigation:

1) **Serum TSH** (High),
2) F T4 (free T4 low), T3
3) **Serum cortisol:** Ideally, cortisol should be measured before and after ACTH administrations because possibility of associated adrenal insufficiency or hypopituitarism
4) **TPO** (thyroperoxidose) antibody level most sensitive test for detecting autoimmune thyroid disease.
5) RBS, CBC, ESR, Blood for C/S

Waltman's sign "hung-up" ankle Jerk :

it is a delayed relaxation phase of an elicited deep tendon reflex usually tested in Achilles tendon of patient

NOTE; Mortality rate is 50% If not treated

For Hyponatremia:

if Serum Sodium 120-130mEq/mL

- Inf. NS 0.9%

if Serum Sodium < 120 mEq/mL

- Inf. NS 3% 100ml + inj. furosemide(Lasix) 20-40mg IV

Rx: **Date:** **Time:**

- **Admit in ICU**
- **Maintain** Airway, breathing, circulation
- **Diet:** NG feed if gag reflex is not intact (or unconscious)
- **02 inhalation** (if cyanosed) stat and SOS
- **Inj. Levothyroxine** 200 mcg IV stat & TDS

Detect infection & treat aggressively with broad spectrum antibiotics i.e.

- **Inj. Co-amoxiclave 1.2gm (Augmentin)**
  1 vial IV stat & TDS

If Concomitant adrenal insufficiency is suspected then:

- **Inj. Hydrocortisone 100mg (Hyzonate)**
  1 vial IV start & TDS

External warming: Rewarming with blankets (faster warning can precipitate cardiovascular collapse so hypothermic patient only warmed with blankets

- **Inj. Omeprazole 40 mg (Ruling, Omezol)**
  1 vial IV stat and OD

For Hypoglycemia:

- Inf. 5% Dextrose 1L IV 50drops/min

After 48-72 hour (or until patient able to take oral tablet)

Tab levothyroxine 50mcg (Thyronorm)

1+0+0+ before breakfast

IV T4:

Initial dose of 200 to 400 mcg IV followed by daily IV doses of 50 to 100mcg until patient can take T4 orally.

if no improvement within 24-48 hours then add

IV T3: (Tropstat)

Initial dose is 5 to 20 mcg followed by 2.5 to 10 mcg every eight hour

If IV T4 or T3 not available then start Tab levothyroxine in same dose of IV

HYPERTHYROIDSM

Definition: Thyroid gland produce too much of the hormone thyroxin which accelerate body's metabolism, causing unintentional weight loss and rapid or irregular Heart rate.

Primary Hyperthyroidism: Graves' disease (80%), toxic multinodular goiter, toxic adenoma, thyroid cancer, mutation of TSH receptor, Struma ovari and iodine excess (Jod-basedow phenomenon)

Chief complaint:

- Heat intolerance, Palpitation, tremors
- Weight loss despite normal or increased appetite, Dyspnea, fatigue, anxiety, oligomenorhea
- Irritability, emotional liability, infertility

O/E: Vitals, moist warm skin

- Rapid or irregular heartbeat
- Tremors, palmar erythema, Sinus tachycardia skin: warm & moist, Lid retraction , lid lag

Investigation:

1) **TSH**: (< 0.1 mU/L (normal: 0.2-4.5 mU/L)
2) **FT4**: Free T4 elevated (T4 toxicosis)
3) **T3:** Elevated (T3 toxicosis)
4) **ECG:** Sinus bradycardia low voltage ECG
5) If Graves suspended do: **TRAb**
6) **Radioisotope Scan**

Definitive Treatment:

Surgery with radioactive iodine or surgery delayed until patient become euthyroid.

RADIOIODINE TRETAMENT : **Indication are**

Toxic multinodular goiter, or single toxic adenoma.

Contraindication;

1) Pregnancy (avoid pregnancy for at least 4-6month following therapy **2)** age <16 year, **3)** Thyroid eyes disease (relative)

Refer to surgery: For toxic Nodular, toxic adenoma. Thyroid cancer, refer to surgeon after being euthyroid

Rx: **Date:** **Time:**

Graves' disease

Beta blocker for symptomatic relief

- **Tab Propranolol 40mg (Inderal)**
  1+1+1 for 6 weeks

If propranolol is contraindicated

(i.e. Asthmatic patient) Then:

Tab Atenolol 25mg (Normitab, Tenormin)
1+0+1 (25 to 50 mg/day) **OR**

Tab verapamil 40mg (Isoptin, Calan)
1+1+1 (40 to 80 mg TDS)

Reduction of thyroid hormone synthesis

- **Tab Carbimazole 5mg (Neo-mercazole)**
  2+2+2 for 3 weeks

Follow up: After 3 weeks. Do TSH if within normal limit then

- **Tab Carbimazole 5mg (Neo-mercazole)**
  1+0+1 for 6-18 months

Sedative

- **Tab Clonazepam 0.5mg (Rivotril , Naze)**

0+0+1 for 3 weeks then 0+0+1/2 for next 3 weeks

Alternative /pregnancy / breast feed: (PTU)

- **Tab Propylthiouracil 50mg (Procarbizole)** 2+2+2+2 (300 to 600 mg/day), during pregnancy the dose of PTU kept below 200mg/day to avoid hypothyroidism in infants

Note: < 1% can develop drug induce agranulocytosis, patient should be warned that if a sore throat/ throat ulcer or febrile illness develop stop the drug and cheeks WBC count.

Propranolol: 20 to 40mg 6th hourly
Start with 10 to 20mg QID orally
Pregnancy: Metoprolol, or propranolol, can be used to treat tachycardia and tremor. Long term TX with β-blocker (>2-6 week) should be avoided (fetal growth retardation & hypoglycemia)
Propylthiouracil: (PTU): Dose: 300 to 600mg/day
Pregnancy: kept below 200mg/day
Maintain dose: 50 to 100 mg/day.
Adjust dose: Adjusted at 4 week intervals to maintain the plasma FT4 near the upper limit of the normal range.

Carbimazole: 10-20mg 8th hourly (10-20mg TDS)
"Patients with small goiters and mild hypothyroidism (FT4; 1 to 1.5 times the upper of normal start with 5-10 mg PO OD
Patient with FT4 value of the 1.5 to 2 times the upper limit of normal start on 10 to 20mg OD"
"Patients with large goiters and more severe Hyperthyroidism (FT4 values around 2 to 3 times the upper limit of normal) start on 20 to 40mg PO (in divided doses), slowly reduce the dose ATD titration.
Minimum maintenance 2.5 to 10mg OD.
Methimazole same as carbimazole.
Patients are evaluated at 4 week intervals with assessment of C\F and plasma FT4. If FT4 don't fall after 4 to 8 weeks, then ↑dose

Factitious hyperthroidison: Rare, ↓TSH, ↑FT4 but no goiter, it is inappropriate abuse of thyroid hormone.
Treatment: Psychological

THYROID STROM (THYROTOXIC CRISIS)

Definition; It is a Life threatening exacerbation of hyperthyroidism
Medical storm: it can be precipitated by acute illness (infection, stroke, trauma, DKA)
After radioactive treatment, **Surgical storm:** after Surgery especially (Thyroid surgery)

Chief Complaint:

- Anxiety, palpitation, sweating,
- Vomiting, diarrhea, jaundice
- Fever, hypothermia, Polyurea
- Cardiac failure, arrhythmia, Atrial fibrillation
- Delirium, seizures, coma

Past Hx: Thyroid surgery, infection, radio iodine therapy, missing of anti-thyroid drug dose
Drug Hx: Carbimazole

O/E:

- Vitals, **Pulse:** tachycardia (>140bpm), Atrial fibrillation
- **BP:** hypertension , **Temp:** Increase
- **RR:** Hyperventilation
- JVP: may be raised if HF occur
- **Goiter:** + , chest; basal crepitation

Investigation:

1) **TSH:** Low
2) **FT4 : FT3;** High (F=Free)
3) **CBC with ESR, ECG**
4) ***RBS:*** Hyperglycemia 2ndry to catecholamine *induced inhibition Of insulin release & increased glycogenolysis*
5) ***Serum calcium:*** (hypercalcemia may occur *due to hemoconcentration & enhanced bone resorption*
6) ***Blood for CS:***
   if infection is suspected

Avoid aspirin:
As it displace T4 from Thyroid binding globulin so raising FT4 serum level.

Rx: **Date:** **Time:**

- **Maintain ABC**(airway, breathing, circulation)
- **Bed rest:** change posture 2 hourly if unconscious
- **Diet:** NG feed if vomiting or unconscious
- **02 inhalation** stat and SOS

If AF (Atrial fibrillation):

Inj. Digoxin (Linoxin) 0.5mg diluted in NS or 5 % dextrose IV Slowly over 20-30 minutes

If Patient is in shock :

Inj. Dopamine or Dobutamine 1 ampule in 500ml NS IV @ 8-10 drops/ min

Cooling of patient: Rehydration, cooling blanket

- **Tab propranolol 40mg (Inderal)**
  2+2+2 orally or via NG tube
  (or IV propranolol 2mg every 4th hourly)
- **Inj. Enoxaparin (Clexane)** 40 mg S/C OD
- **Inf. Dextrose Saline 5% IV stat**
  (Till normal hydration status.)
- **Inj. Dexamethasone 4mg + 4ml dextrose saline**
  2ml IV stat and QDS
- **Tab Propylthiouracil** [PTU] **50mg (Procarbizole)**
  3+3+3 **OR**
  Tab carbimazole 5mg (Neo-mercazole)
  3+3+3

4 Hours after carbimazole OR 1 hour after PTU

Potassium iodide **(Lugol's iodide)** 10 drops in one glass of water stat and TDS

If infection suspected:

Inj. Co-amoxiclave 1.2gm (Augmentin) IV TDS

Remember 5 P for treatment:

P: Propranolol. **P:** Propythiouracil. **P:** Prednisolone. **P:** Potassium iodide (Lugol's iodide)

ADRENEL INSUFFICIENCY(Addison`s disease)

Definition : Autoimmune destruction of the adrenal gland (autoimmune adrenalitis) Hyponatremia & hyperkalemia with lethargy, postural hypotension highly suggestive of AD (Addison disease)

Chief Complaint:

A) Primary adrenal failure (Raised ACTH)

- Hypotension and acute circulatory failure/ shock (Addisonian crisis).
- Anorexia may be an early feature, which progresses to nausea, vomiting, diarrhea, & sometimes, abdominal pain.
- Crises may be precipitated by infection or by stress
- Hyperpigmentation:due to ↑ ACTH (Palmar crease)
- Hyperkalemia & volume depletion occur only in primary adrenal failure.

B) Secondary adrenal failure (↓ ACTH)

- Same symptoms and signs as primary disease but no hyperpigmentation

C) Acute adrenal crisis: Critically ill, fever, shock, confusion, coma & even death

Past HX: Rheumatoid arthritis or other connective tissue disease, bronchial asthma

5 HYPO: 1) Hypo-tension, **2)** Hypo-glycaemia **3)**Hypo-natremia, **4)** Hypo-aldoesterone **5)** Hypo-PH (metabolic acidosis)

2 HYPER: 1) Hyper-kalemia, **2)** Hyper-renin

O/E: Vitals, BP: low, Pulse: Rapid thready pulse. Skin: pigmentation in buccal mucosa

Investigation:

1) **Short synacthen test (short ACTH-Suppresion test):**
   250 microgram ACTH IM injection
   Normal individual= ↑cortisol
   Primary adrenal insufficiency = ↓Cortisol
   Secondary adrenal insufficiency = ↑Cortisol
2) **RBS:** (Hypoglycemia) **Serum Electrolyte:** (↓Na, ↑K)
3) **Serum Cortisol:** Low, **Serum Calcium:** (mildly↑)
4) **TSH:** Slightly elevated, **ESR:** Raised, **ECG**
5) **CBC:** (leukocytosis, Eosinophilia, Thrombocytopenia)
6) **Blood for CS:** If sepsis is suspected

FOR C/F Remember "LACKS ADRENAL":

L: Low Na+, **A:** Acidosis, **C:** Ca+ elevation, **K:** K+- elevation, **S:** Skin hyper pigmentation **A:** Altered mental status, **D:** depression, **R:** Refractory hypotension. **E:** Elevated ACTH Eosinophilia. **N:** Nausea/vomiting, **A:** Asthenia, **L:** Loss of appetite.

Rx: **Date:** **Time:**

If Suspected or acute adrenal crisis:

- **Diet:** NPO (NO per oral)
- **02 inhalation** stat & SOS
  - **Inf NS (0.9%) 1L** (30ml/kg) initial bolus then 1L IV @ 40drop/min (according to BP response) If shock then start non-adrenaline(norphine)
  - **Inj. Hydrocortisone 100mg (Hyzonate)** 100-300mg IV stat & 100mg QID –for 24hrs

If patient Condition is good after 72 hours then change to oral steroids for maintenance therapy

Tab Hydrocortisone 15mg-30mg/day in BD/TDS like; 10mg at 7am, 10mg at 1 pm, 5mg at 7 pm)
Maintenance dose: 15-30mg/day titrate-depend on response

- Mineralocorticoid replacement is not needed until dose of hydrocortisone is < 100mg/day
  If needed (primary hypoadrenalism, volume depletion, Hyponatremia or hyperkalemia) then **Tab Fludrocortisone** 0.1 mg 1-3 tab OD or alternate day (dose: 0.05 to 0.1 mg/day)
- **Inf. Dextrose Saline 10% or 25%** IV @ 20 drops/min (for hypoglycemia)
- **Inj. Omeprazole 40mg (Omezol, Ruling)** 1 vial IV stat & BD
- **Inj. Ceftriaxone 1gm** (Rocephin) IV (ATD) BD
- **Treat hypoglycemia Hyponatremia as usual**
- **Hyperkalemia: will respond to volume replacement**

If the diagnosis of adrenal failure is not Conformed then

- **Inj. Dexamethasone 4mg (Decadron)** 2 Vial IV Stat (because dexamethasone will not interfere with measurement of Plasma Cortisol like hydrocortisone)

Steroid card: Patient should carry this all the time and should give information regarding dx, steroids and doctor

Note:

- If febrile illness then double the dose of hydrocortisone
- Patient should be given a hydrocortisone emergency pack and trained in the self-administrations of hydrocortisones 100mg IM they should be advised to take

	Glucocorticoid	Mineralocorticoid (androgen)	ACTH	Adrenal androgen
Addison's disease	Low	Low	High	Low
Withdrawal of steroid drugs	Low	Normal	Normal	Low
Hypopituitarism	Low	Normal	Normal	Low

Causes: A) **Primary:** Tuberculosis, metastasis, APS, meningococcal septicemia, HIV, severe Illness
B) **Secondary:** Pituitary disorder (tumor irradiation & infiltration)
Drug: ACEi, heparin, lead poisoning **C) Exogenous**: Glucocorticoids therapy
D) **Pseudo-hypoaldosteronism**: aldosterone resistance (rare)

PHEOCHROMOCYTOMA

Definition; Tumor of chromaffin tissue that secrete catecholamines. Account for less than 0.4 % of hypertension cases

Chief Complaint:

- **Asymptomatic** (in some patients for years)
- **Traid of symptoms**: (Episodic Palpitation, Headache (attacks of headache), Profuse sweating)
- **Other symptoms:** Anxiety, panic attack, Nausea, vomiting, Flushing, fever, weight loss ,angina
- **Also associated with:**
  - ✓ Von Hippel-Lindau (VHL)syndrome
  - ✓ Multiple endocrine neoplasia (MEN2)

O/E: Vitals, Pulse: Tachy, tachyarrhythmia's

- **BP**: Hypertension (Intermittent; 40%, Constant; 60%)

Investigation:

1) Plasma fractionated free metanephrine
2) Urinary fractionated metanephrine
3) Serum Creatinine
4) Plasma fractionated catecholamine
5) Serum CgA
6) Clonidine suppression test

Imaging

1) CT or MRI of abdomen

Diagnostic:

➢ **24 hour urinary metanephrine:** Elevated (sensitivity: 97%)

Careful: Remember β-blocker should not be started before Alpha blockage effect achieved to avoid a hypertensive crisis

Metastatic Pheochromocytoma:

May be treated with combination of chemotherapy (e.g cyclophosphamide, vincristine & dacarbazine)

Rx: **Date:** **Time:**

- **Tab Phenoxybenzamine 10mg**
  10-20mg orally 6-8 hours, increase gradually about every 3rd day- until BP is controlled Then
  Maintenance dose is: 10mg 2+2+2 continue (40-60mg daily)

Alternate to Phenoxybenzamine:
Prazosin, terazosin, doxazosin

On 3rd day of above medication:

Start patient on high Sodium diet (>500mg daily) because of catecholamine induce volume contraction & orthostatic hypotension by alpha blocker [Contra: Congested heart failure, renal insufficiency]

After achieved alpha blocker effects then start
Tab Propanolol 10mg (Inderal) TDS (10-40mg)
In ER: Tab Nifedipine 10mg (Nifedil) 1+1+1
increase dose gradually to 60mg BD

Surgical treatment:

- Laparoscopic removal of tumor
- if tumor very large then laparotomy

For inoperable or metastatic tumors: Add Metyrosine to reduce catecholamine synthesis Initial dose : 250mg QDS daily, increase daily by 250-500mg to maximum of 4 g/day

NOTE:

- ✓ Hypertensive crisis be can be managed initially with oral Nifedipine 10 mg.
- ✓ For severe HTN during operation or in ER: managed with continuous IV Nicardipine 2-6 mcg /kg /min or Nitroprusside 0.510mcg/kg/min. & phentolamines
- ✓ Tachyarrhythmia's is treated either IV beta blocker, esmolol or lidocaine.

Infectious Diseases

MALARIA

Organism – Plasmodium (Vivax, Falciparum, Ovale, malaria, knowalasi)

Chief Complaint:

- Fever with rigors and chill, sweating
- Nausea, vomiting, shortness of breath
- Convulsion/coma

Past Hx: Travel to endemic zone (e.g hill tracts)

O/E: Vitals

- JACKLET,GCS, Hepatomegaly, Splenomegaly

Investigation:

1) **CBC With Peripheral Smear**
   - **Thick smear**: for demonstration of parasite
   - **Thin smear**: for demonstration of species
2) **ICT for malaria**
3) **Serum bilirubin, RBS,**
4) **Serum electrolyte, Serum lactate.**

Other investigations

1) **HRP – 2** (Histidine Rich protein 2) (para sight F test Dipstick for monoclonal antibodies against P.Falciparum
2) **PLDH** (Plasmodium lactate dehydrogenase test) used for monitoring following Treatment and to diagnosed treatment failure
3) **QBC for malaria parasite** (Quantitative Buffy coat) more sensitive than thick smear
4) **PCR**: Detect is as low as 0.02 to 1 parasite/MCL
5) **G6PD** if have to give primaquine

Precaution for primaquine

- G6PD deficient develop severe hemolysis after getting primaquine.
- Primaquine should be stopped, admit the patient, Supportive Treatment and blood transfusion
- Primaquine contraindicated in pregnancy, age< 6month, lactate women up to 6months

Dose guideline for Artemether+ lumefantrine

Weight 5-14kg= 1tablet BD (dose 20/120)
Weight 15-24kg= 1 tablet BD (dose 40/240)
Weight 25-34kg: 1 and half tablet BD (dose 40/240)
Weight > 35Kg: 2 tablet (dose 40/240)

Treatment of malaria in Pregnancy:

- **Uncomplicated falciparum malarial;** Tab Arceva 80/480 1+0+1 for 3 day.
- **Severe malaria;** First line: Inj. Artesunate (in all trimester); 0, 12, 24 hour then 24 hourly (max 5 days) If Artesunate not available then Inj. Artemether IM/or IV and Start on oral after injectable Tab Arceva 80/480 BD 3 days

Date: **Time:**

Rx:

A) **Vivax malaria, P.Falciparum, P.Malariae** (in Chloroquine sensitive area only)

- **Tab Chloroquine 250mg (Resochin)**

Day 1: 4tab, **Day 2**: 4tab, **Day 3**: 2tab **OR**
4tab at 0 hour, **2tab** at 6hour, **2tab** at 24hour and **2tab** at 48hour (0, 6, 24, 48hours)

For Radical cure

To destroy Hypnozoites in liver
Tab primaquine 7.5mg 1+0+1 – for 14 days
(Dose: 25m/kg Adult, 0.3mg/Kg in children)

B) **Uncomplicated P.Falciparum infection with Chloroquine resistance:**

- **Tab Artemether + lumefantrine 80/480 (ARCEVA)** 1+1 with milk for 3 days (Adult dose weight Kg>35Kg) or
  - ✓ **Start dose:** 0 hour
  - ✓ **2nd dose**: After 8 hours from 1st dose
  - ✓ **3rd dose**: 24 hours after 1st dose
  - ✓ **4, 5, 6th dose**: 12 hourly. **OR**
- **Tab Quinine sulfate 650mg (Zafquin)** 1+1+1 3-7 days & if quinine given for 7 days then also add one of following

Cap Doxycycline 100mg (Vibramycin)
1+0+1 (be erect for atleast 30 mins) for 7 days **OR**
Cap Clindamycin 300mg (Klinda, Dalacin C)
2+0+2 for 7 days

Severe falciparum malaria Or complicated infection:

(its medical emergency)

- Pass NG: Pass catheter
- **Inj. Artesunate (GEN-M)**
  Dose: 2.4 mg/Kg IV BD then once daily
  (OR 0 hour, 12hour, 24hour, then 24hourly)

OR

- **Inj. Quinine dihydrochloride (Zafquin) 300mg/5ml** 4 ampule diluted in inf 5% Dextrose saline 500ml IV@ 30 drops/min stat and **then**

Inj Quinine dihydrochlonide 300mg/5ml 2 ampule diluted in inf 5% dextrose saline 500ml IV @30 drops/min 8hourly

❖ **Treatment for mixed infection**
Tab Arceva 80/480 1+0+1 for 3 days **plus**
Tab primaquine 7.5 mg BD for 14 days

❖ Malaria Prophylaxis:

✓ Area with Chloroquine sensitive: **Tab Chloroquine 500mg weekly**

✓ Area with Chloroquine resistance falciparum: can use any one of the following

1) **Mefloquine 250mg 1 tab weekly** (start 1-2 week prior travel then in Area & for 4 weeks after leaving that area), can be used in pregnancy
2) **Malarone: 1 tab daily; 250mg atovaquone/100mg proguanil** (Start 1-2 days before, during and 7 days after leaving such areas)
3) **Doxycycline 100mg (cap Vibramycin) OD** (Start 1-2 days before travel, during & 4 weeks after leaving such areas)

❖ Treatment: P. Falciparum malaria

A) Mild falciparum Malaria (oral drugs)

- Tab Artesunate 120mg stat then 60mg/day for 6days plus sulfadoxine (25mg/kg)/ pyrimethamine (1.25 mg/kg) as a single dose
- Tab Quinine 10mg/Kg TDS-5 days (reduced to BD in quinine toxicity)
- Followed by single dose of 3 (sulfadoxine 1.5 mg and pyrimethamine 75 mg)

Alternative drugs:

Tab Artemether + lumefantrine 80/480 mg (ARCEVA) PO BD-3 days

Atovaquone 250 mg + Proguanil 100mg combination 4tablets/day for 3 days

B) In severe case: **Artesunate or Quinine + Doxycycline or Clindamycin**

➢ **IV Artesunate** is the drugs of choice (Individuals ≥20 kg, 2.4 mg/kg IV STAT followed by 2.4 mg/kg at 12 & 24 hour and then daily; Individuals <20 kg: 3mg/kg IV (first dose), followed by 3mg/kg at 12 and 24 hours, followed by 3mg/kg once daily)

➢ **IV Quinine infusion: Loading dose:** 20mg/Kg (Maximum 1.4 gram) infusion over 4 hours. Then 10 mg/Kg (Maximum 700 mg) 8th hourly

Monitor (Quinine): Blood sugars (Quinine produces hypoglycemia)

✓ ECG – QT prolongation and arrhythmia, Quinine Toxicity – "Cinchonism"

➢ **Doxycycline 100 mg** BD Children: 2.2 mg/kg (up to 100 mg) BD 7days.

➢ **Clindamycin**: 10 mg base/kg once (maximum 900 mg) followed by 15mg base/kg per day (max 1350 mg) divided into three equal doses 7 days.

Major differential features of Malarial Parasites:

FEATURES	P.Vivax, P.Ovale	P.Malariae	P.Falciparum
Periodicity	'Tertian'	'Quartan'	Aperiodic
Exo-erythrocytic cycle (outside RBC)	Can remain as hypnozoites	Pre-erythrocytic only	Pre-erythrocytic only
Relapses	Up to 2 years	Many years later	Up to 1 year
Red cell preference	Retic and cells up to 2 weeks old	Older cells	Cells of all ages
Number of merozoites released per hepatocyte	10,000	15,000	30,000

✓ Recurrence of malaria can occur as a result of treatment failure (recrudescence) or reinfection; these may be difficult to distinguish.

✓ Recrudescence: A repeated attack of malaria due to the survival of malaria parasites in RBCs

✓ Relapse: Caused by reactivation of hypnozoites in Vivax & Ovale.

✓ Recrudescence occurs often within days or weeks; relapse occurs within weeks or months.

Definition of severe falciparum malaria; is defined as 1 or more of the following features occurring in the absence of an identified alternative cause & in the presence of Plasmodium falciparum.

MANIFESTATIONS	DEFINITIONS
Impaired Consciousness	GCS < 11 in adults
Prostration	**Prostration** extreme physical weakness or emotional exhaustion Generalized weakness and person is unable to sit, stand, or walk without support
Multiple convulsions	> 2 episodes in 24 hours (give inj. Valium or Phenobarbital)
Acidosis	Plasma bicarbonate level of <15 mmol/L, or venous plasma lactate ≥5 mmol/L. C/F include rapid, deep, labored breathing. Acidosis is an important cause of death from severe malaria.
Hypoglycemia	(children <5yrs; <54mg/dl) (children ≥5 years & adults: <40mg/dl)
Severe anemia	Hb% ≤5 g/dL or hct ≤15% in children (<12 years of age) (Hb <7 g/dL in adults) with parasite count >10,000/mcL
Renal impairment	Plasma or serum creatinine >3 mg/dL or blood urea >20 mmol/L
Jaundice	Serum bilirubin >3 (0.2 % parasitemia) Mild jaundice due to hemolysis in malaria is common. Severe jaundice due to hemolysis, hepatocyte injury, and cholestasis
Pulmonary edema or ARDS	Chest X ray confirmed or O2 saturation <92% on room air with respiratory rate > 30/min
Significant bleeding	From the nose, gums, or venipuncture sites, hematemesis, or melena. ↓ platelets, DIC
Shock	**Compensated:** capillary refill ≥3 seconds or temp gradient on leg (mid to proximal limb), but no hypotension. **Decompensated:** systolic BP<70 in children or <80 mmHg in adults, with evidence of impaired perfusion
Hyper parasitemia	P. falciparum parasitemia >10 percent (>500,000/mcL)

Management (falciparum malaria) of complications

Manifestation	Treatment
Cerebral malaria (Coma)	Maintain ABC and Rule out convulsions, hypoglycemia
Hyperpyrexia	Tepid Sponging, cooling blanket, Paracetamol (Tablet or infusion)
Convulsions	Maintain ABC, rule out hypoglycemia IV Diazepam, Lorazepam, Or phenobarbital
Hypoglycemia; Increased glucose consumption by host and the malaria parasites Drugs – quinine	Treat with 50% dextrose inj. followed by 10% dextrose infusion
Severe anemia Hemolysis DIC	Blood transfusion, FFP
ARDS mortality rate is >80%	high flow O2 venesection (250 ml blood), IV diuretics, stop IV fluids intubate and add PEEP/CPAP in life-threatening hypoxemia
Acute renal failure	IV Diuretic/Dopamine Hemodialysis
Coagulopathy and **spontaneous bleeding** thrombocytopenia	Transfuse fresh whole blood, fresh frozen plasma/cryoprecipitate/platelets
Metabolic acidosis lactic acidosis, in children ketoacidosis	Manage hypoglycemia, hypovolemia and Gram-negative sepsis Give oxygen.
Algid Malaria' or shock (Gram negative septicemia) (in endemic areas salmonella bacteremia)	Blood cultures IV antibiotics (3rd generation cephalosporin's) Mange shocks – fluids
Aspiration pneumonia	IV Antibiotics, chest physiotherapy, Oxygen
Hyperparasitaemia (e.g. > 10% of circulating erythrocytes parasitized in non-immune patient	Exchange transfusion

DENGUE FEVER (Break bone fever)

Definition; Fever caused by dengue virus transmitted by female mosquitoes of genus Aedes

Chief Complaint:

1) **Prodrome;** 2 days of weakness myalgia, headache
2) **Symptoms;** Fever, Continuous or biphasic (saddle back) fever curve which last for 2-7 days & associated with headache, sweating, prostration, joint pains, GBA, back pain ("break bone fever)
   - Pain on eye movement lacrimation, eye congestion, redness, Anorexia, nausea, vomiting abdominal pain loose stools, relative bradycardia, lymphadenopathy
3) **Rashes;** Macular rash in first 1 – 2 days
   - Macular – popular, scarlet morbilliform rash from day 3 -5 on trunk

Past Hx: DM, HTN, Menstrual Hx in female

O/E: Vitals (BP, Pulse, Spo2%, Temp), GCS, JACKLET, Tourniquet fest; +, Hepatomegaly

WHO classification

Grade I	Fever, body pain, myalgia, constitutional symptoms, positive tourniquet test (Petehiae Formation)
Grade II	Spontaneous bleeding
Grade III	Spontaneous bleeding + circulatory failure
Grade IV	Severe shuck

Investigation

1) **CBC;** (TLC and platelet:↓"Bicytopenia")
   Hematocrits (Hct); ↑ 5 – 10% mild,
   Hct 20%↑: Severe plasma leakage
2) **Dengue NS 1 antigen**; 1 to 3rd day (can be upto 5days)
3) **IgM** (Antidengue IgM) 6th day & onwards
4) **IgG** (Anti–dengue IgG) 6th day & onwards
5) **RT–PCR. 6) Dengue virus Isolation**
7) **SGPT, SGOT. 8) Serum bilirubin & Creatinine**

Monitor; vitals 1-4 hourly, urine output 4-6 hourly, RBS, Hct; before and after fluid replacement

Rx: **Date:** **Time:**

A. Group A Patient

Without warning symptoms and no high-risk condition (e.g pregnancy, infancy, DM, HTN) can tolerate oral fluid and passes urine (6thourly) treat as out patient

- **Increase fluid intake**; >6 glasses of Water, milk, fruit juice (be careful in diabetic patient) ORS, Barley/rice water, Coconut water

Note: plain water alone may cause electrolyte imbalance

- **Sponging with tepid water**
- **Tab paracetamol 500mg (Panadol, Calpol)**
  1+1+1+1 (Not exceed than 3gm/day)

B. Group B patients: (Admit the patient)

With high risk condition (e.g) pregnancy, DM, infancy, old age, renal failure, HF, chronic hemolytic diseases, obesity, HTN) or warning sign Treat as in patient (Admit the patient)

- **Inf NS (0.9%)** IV@10drops/min for 48hours (1.5ml/kg) hour or 40ml/hour)
- **Inf paracetamol 1g/100ml (Provas)** IV Stat and TDS
- **Inj. Omeprazole 40mg(Risek, Ruling)**
  1 vial IV stat and OD
- Cold sponging (If needed)

C. Group C Patient (Admit Patient)

With severe plasma leakage/shock severe bleeding, sever organ impairment myocarditis, encephalopathy, renal damage) sever metabolic abnormality, Hypotension/shock

- **Inf NS or RL** 30ml/kg infused over 15min then continuous infusion 10 to 20 mL/Kg/hour until vital sign and urine output normalize
  - ➢ Platelet transfusion; If count < 10,000K
  - ➢ No role of corticosteroids

Warning Sign

i) Severe abdominal pain or tenderness **ii)** Persistence vomiting
iii) No clinical improvement or worsening of situation
iv) Mucosal bleed (From Nose, gum, blood in vomit, black stool)
v) Lethargy, restlessness, sudden behavioral changes **vi)** Liver enlargement >2cm
Vii)↑in Hct (>20%) **viii)** Less or no urine output for 4 – 6 hours
IX) Pale, cold and clammy hands and feet

SIGN OF RECOVERY: i) Stable vital (BP, pulse, breathing rate, Normal Temp)
ii) No evidence of bleeding, No vomiting, no abdominal pain
iii) Return of appetite, good urinary output. **OR** Stable Hct at baseline level.

Phases of Dengue infection

1: Febrile phase; (for 2-7 days)	2: critical phase	3: Recovery phase
Fever: sudden onset Crescendo (saddle type) • Associated: maculopapular Rash on face, neck, chest spare palm & sole. Petehiae, mucosal bleed, Per-vaginal bleed, Generalized body ache , alter taste sensation, Conjunctival injection, sore throat, vomiting, headache,	Also called Afebrile phase (defervescence) (Rapid ↓ in temp) • Occur after 3days of fever • Last about 24 – 48 hours' • Increase capillary permeability • Shock (CS, DS), Organ dysfunction • Clinical fluid Accumulation: ↑Hct, ↓ protein, ↓albumin • Warning signs	• Plasma leakage stop • Reabsorption of fluid from extravascular space • Hct start decrease • GIT symptoms improve • Patient general wellbeing improve • Occur after 24-48hr of critical phase

Indication of IV fluid

- Patient can`t tolerate oral fluid or is vomiting
- Hct continue to rise 10%-20% despite oral rehydration **OR** Impeding shock/shock

Summary of management:

- Maintain ABC (Airway, breathing, circulation), ↑ Fluid intake.
- Inf. NS or R/L IV (IV fluid usually needed for 24-43 hours)
  - ➢ Start with ˙5 – 7 ml/kg/hour for 1 – 2 hour then
  - ➢ 3 – 5 ml/kg/hour for 1 – 2 hour then
  - ➢ Reduce to 2 – 3 ml/kg/hour or less according to clinical response

WHEN TO STOP IV FLUID THERAPY:

- ❖ Cessation of plasma leakage (marker is Hct) and Stable vital (BP, pulse, Temp, peripheral perfusion)
- ❖ Hct decrease & Apyrexia (without the use of Antipyretic) for more than 24 – 48 hours
- ❖ Resolving abdominal pain/symptoms
- ❖ Extended fluid therapy for >48 hour will cause pulmonary edema thrombophlebitis

Some don`ts & Do`s

Don`ts	Do`s
1)Don`t give anti-platelet;(Aspirin , Clopidogrel) 2)Don`t give anti-coagulant (Heparin, Warfarin) 3)Don`t give steroids 4)Don`t give I/M injection 5)Don`t do tooth brushing & combing 6)Don`t give anti-biotics	1) Use mosquito repellent, Paracetamol for high fever 2) Start IV fluid for Repeated vomiting, rapidly ↑ in Hct 3) Do recognize critical phase 4) Encourage fluid intake, Monitor input/output 5) Clinical assessment before & after each fluid bolus 6) Albumin for refractory shock. 7) Blood transfusion if Hct dropping with unstable vital sign or significant bleeding

- ✓ No fever for at least 24hours without use of anti-pyretic drug.
- ✓ At least 2 days have lapsed after recovery from shock. And Improved appetite. Normal Hct at base line value
- ✓ No distress from pleural effusion, No Ascites & Platelet > 50,000 AND No other complication

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Discharge Criteria

- ✓ No fever for at least 24hours without use of anti-pyretic drug.
- ✓ At least 2 days have lapsed after recovery from shock. And Improved appetite. Normal Hct at base line value
- ✓ No distress from pleural effusion, No Ascites & Platelet > 50,000 AND No other complication

BRUCELLOSIS

Definition: It also called undulant fever, Malta fever, Gibraltar fever or Mediterranean fever. Transmitted to human by contact with fluid from infected animals (Sheep, cattle, goats, pigs, or other animals) or derived food product such as unpasteurized milk & cheese Spread.

Chief Complaint:

1. Undulating fever; Fever persists for several weeks then an afebrile period followed by relapse, associated with night Sweats
2. Well Describe cause of fever of unknow origion
3. Myalgia, weakness Arthritis; Knee, hip, shoulder, Sacroiliac, Sternoclavicular joint.
4. Osteomyelitis; lumbar or Thoracic Vertebrae

Other problems: Pneumonia, lung abscess, lymphadenopathy, pyelonephritis, Endocarditis, Hepatosplenomegaly, , prostatitis, salpingitis, Epididymo-orchitis, , Osteoarticular disease

Past HX: - Multiple visit to physician, Contact with animal

O/E: Vitals, JACKLET, lymphadenopathy

Investigation:

1) **CBC with ESR, Malarial parasite**
2) **Brucella IgM**: (IgM ↓Slowly) (IgG, IgA ↑)
3) Culture of blood, CSF, Bone marrow, joint aspiration (isolation of Brucella)
4) Brucella Standard Agglutination Test (SAT)

Organism	Source
B. Meltiness	Sheep, Goat, Camel
B. Abortus	Cattle, Buffalo
B. Suis	Rodents
B. Canis	Dogs
B. Orris	Sheep

For Fever add:

Tab/Syp Paracetamol (Panadol, calpol) TDS

Can also add:

Tab multivitamin (Chewcal) OD for one month

If loss of Appetites: Any appetizer

syrup (Tris-oris, Trimetabol) 2tsf 30 min before meals

Rx **Date:** **Time:**

Preferred regimen:

Doxycycline + Aminoglycoside

- **Inj. Streptomycin**
  750mg to 1gm 1M Daily for 21 days
- **Cap Doxycycline 100mg (Vibramycin)**
  1+0+1 for 6 weeks

Alternate regimen:

- **Cap Doxycycline 100mg (Vibramycin)**
  1+0+1 **PLUS**
- **Tab Rifampicin 300mg (Rimactal)**
  0+2+0 (15mg/kg) for 6 weeks

In pregnancy Brucellosis

Tab Rifampicin 300mg (Rimactal)

0+2+0 (15mg/kg) - 4 weeks

Tab Co-trimoxazole 160/800mg **(Septron DS)**

1+0+1 (5mg/kg) - 4 weeks

Remember; not to prescribe doxycycline in age < 8years

Neuroborreliosis (1+2+3)

1. **Inj. Ceftriaxone 1gm** (Oxidil, Rocephin)
   1 vial IV BD - First 4 to 6 weeks
2. **Tab Rifampicin 300mg (Rimactal)**
   0+2+0 (15mg/kg) -6 weeks
3. **Cap Doxycycline 100mg (Vibramycin)**
   1+0+1 – 6 weeks

Duration of therapy: 14-21 weeks

In Endocarditis (1+2+3+4) Brucellosis

1.Surgical intervention

2.Inj. Gentamycin 5mg/kg IV for 1 month

3.Rifampicin + Doxycycline - 12 weeks

4. Septron DS 160/800mg 1+0+1 for 6 months

Note:

In Spondylitis Brucellosis also TX for at least 12 weeks

DIPHTHERIA (Corynebacterium diphtheria)

DEFinition: An infection mainly occur in the throat, by toxin which act locally (throat) & systemically. spread droplets breath out into air secretion from nose, throat such that mucus & saliva, infection skin lesion, bedding or clothes an infected person has used, mortality 5-10%

Chief Complaint:

- Acute sore throat
- Low grade fever, swollen gland in neck
- In severe cases; Myocarditis or neuropathy
- Fibrinopurulent exudates produces a pseudo membrane of the tonsils with dysphagia, fever, headache, change in voice
- Dysphagia (difficulty in swallowing) due to Paralysis of the muscles of the Palate.

On Examination: Vitals, JACKLET

- Pseudo membrane of tonsils
- Bull neck appearance (edema of neck)
- Polyneuropathy and diminished deep tendon reflexes bulbar paralysis

Investigation

1) **Clinically diagnosis**
2) **To conform diphtheria infection** combine isolation of C diphtheria on cultures with toxigenicity testing (which can be performed by using the Elek test)
3) **PCR**
4) **Proteinuria**
5) **CBC** (can cause low platelet count)

Cutaneous diphtheria

Ulcer is punched out with undermined edges & is covered with a greyish white to brownish adherent membrane

Rx: **Date:** **Time:**

- Maintain ABC(airway, breathing, circulation
- **Inj. Benzathine Penicillin (Benzibiotic)**
  0.6 million unit, 1.2 million unit
  Dose: 0.1 to 0.15 million unit per kg) IV 4 – 6 hourly for 10 – 12 days

Alternate to penicillin G

- **Tab Erythromycin** 250mg, 500mg **(Erythrocin)**
  1+0+1 40mg/kg/day for 14days
- **Tab Penicillin 250mg**
  1+1+1+1 for 14 days

Diphtheria antitoxin:

- ✓ Ask about previous allergies
- ✓ Give a scratch test dose of 1:100 dilution
- **Inj. Diphtheria – Antitoxin**
  6 ampule in 500ml NS IV@30drops/min (or over 4hour) in case of any reaction stop infusion
- **Inj. Co-amoxiclave 600mg, 1.2gm (Augmentin)**
  Dose: 50mg/kg/day IV stat in 3 divided doses or TDS
- **Inj. Hydrocortisone 250mg (Hyzonate)**
  1vial IV stat and BD

For contacts (Post exposure prophylaxis)

- **Tab Erythromycin 250, 500mg (Erythrocin)**
  1+1 for 10days

40mg/kg/day for children, 1g/day for adult

Vaccines – for prevention:

DPT = Diphtheria – Tetanus – Pertussis

- Primary dose; 6,10,14 weeks of life
- Booster dose; second year of life (12 – 23 months)
- At 4 – 7 years & at 9 – 15 year of age

SCRUB TYPHUS (Rickettsia fever)

Definition; It is a mite-born disease caused by orientia tsu-tsu-ga-mushi (formerly) called Rickettsia tsutsugamushi) which is seen on body of forces and rural rodents including rats, values, and field mice. Infection commonly presents as an acute febrile illness 7-10 days after bite

Chief Complaint:

- Fever (start during the 1st week 40 to 40.5 °C), Severe headache common, as is Conjunctival injection
- A macular rash develops on the trunk during 5th to 8th day of fever, often extending to Arms and legs and Macular rash may disappear rapidly or become maculopapular and intensely colored
- Cough (during the first week of fever)
- Pneumonia (may develop during 2nd week)
- Splenomegaly
- Rarely: Acute renal failure, shock, DIC

Past Hx: Travel to forest

On examination;

- Vitals (Pulse, BP, SPO2%, Temp)
- Lymphadenopathy, splenomegaly
- Rashes on body, fever

Investigation

1) **CBC:** (Thrombocytopenia, rarely leukopenia, leukocytosis)
   Early lymphopenia with late lymphocytosis
2) **LFTS** (Elevated liver enzymes)
3) **Serum Creatinine** (Elevated)
4) **Serum Bilirubin** (Elevated)
5) **Hypo Albuminemia** (50% of Cases)
6) **Serology**- the indirect fluorescent antibody (IFA) IFA test remain the mainstay serologic diagnosis
7) **PCR** (Sensitivity 82%, Specificity 100%)
8) **Well-Felix test**; (Titer ≥1:320 is diagnostic)
9) **Biopsy of an Escher** or generalized rash

Rx: **Date:** **Time:**

- **Maintain ABC** (Airway, Breathing, Circulation)
- Bed rest

Mainstay of treatment is doxycycline

- **Cap Doxycycline 100mg (Vibramycin)**
  200mg orally followed by
  1+1 for 7 days; Be erect for at least 30mins and drink more water after taking doxycycline as it causes esophagitis
- **Tab Paracetamol 500mg (Panadol, Calpol)**
  1+1+1

Remember: Even one dose of doxycycline can kill the organism so if patient fever is not responding to doxycycline then think there is possibility of resistance or we should suspect an alternative diagnosis

If we suspect resistance then:

- **Tab Azithromycin 500mg (Azitma, Zygrel)**
  1+0+0 for 6days
- **Cap Esomeprazole 40mg (Nexum, Ezomol)**
  1+0+0 14 days
- **Tab paracetamol 500mg (Panadol, Calpol)**
  1+1+1

Chemoprophylaxis: Prevention with a weekly 200mg dose of doxycycline is recommend started before exposure and continued for 6 weeks after exposure

LEPTOSPIROSIS (Well Disease)

Definition: It is an infection caused by one of the several serotype of spirochete Leptospira spread through direct contact with urine (or urine in water), blood or tissue of an infected animal. it is a biphasic disease that begin with flu like symptoms (fever, chill, Myalgia, headache) the first phase resolves and the patient is briefly asymptomatic until the 2nd phase begins which is characterized by meningitis, Liver damage and renal failure (well syndrome)

Chief Complaint:

1. C/F due to vasculitis (small vessels)
   Anicteric phase: >90% symptomatic have relatively mild disease
   Leptospiremic phase; Fever, chill, Severe headache nausea, vomiting, cough, chest pain, myalgia, photophobia
2. **Immune phase**; Antibody mediated phase

- Liver disease, Renal disease
- Many Patients will develop CSF abnormality (↑ WBC in CSF), meningitis

3. Severe leptospirosis
   (well syndrome)/Icteric from

- Jaundice, Hepatomegaly, hepatic tenderness, liver failure, splenomegaly
- Renal failure (mainly seen in 2nd week)
- Pulmonary hemorrhage, ARDS
- Pericarditis, Myocarditis, CCF, shock Rhabdomyolysis, hemolysis

Investigation

1) Urine dark field microscope (fresh sample)
2) CBC: ↑WBC, ↓Platelets)
3) PCR: can detect leptospiral DNA in early phase
4) Leptospira IgM (+by the end of 1st week)
5) Serum Creatinine, LFTS, creatinine kinase
Modified fanes criteria: For presumptive dx

Rx: Date: Time:

- **Cap doxycycline 100mg (Vibramycin)**
  1+1 for 7days

Other antibiotics which can also be used

- **Amoxicillin 500mg** QID for 7 days or
- **Azithromycin 500mg** OD for 7 days or
- **IV penicillin G** 1.8 million unit QID -7 days or
- **IV ceftriaxone 2mg** IV OD for 7days

- **Cap Esomeprazole 40mg (Ezomol)**
  1+0+0 – for 14 day
- **Tab Paracetamol 500mg (Panadol, Calpol)**
  1+1+1 (for pain, fever)
- Can add multivitamins, other painkillers

Prophylaxis:

- ✓ Doxycycline 200mg PO every week for 2 – 3 week
- ✓ Improve housing, infrastructure and sanitation standard
- ✓ Rodent abatement efforts and flood migration project can be help in prevention
- ✓ Proper use of personal protective equipment (PPE) by people who have a high risk of occupational exposure can prevent infections
- ✓ Reservoirs Rodent (Rats) are main reservoir

MUMPS

Chief Complaint:

- B/L swollen painful parotid gland (Parotitis)
- Fever, myalgia, malaise, headache

Investigation:
Symptomatic diagnosis: swollen parotid gland
1) Virus culture from throat or check swab
Complication: orchitis, oophroitis, pancreatitis, encephalitis, Meningitis, Myocarditis and Arthritis
Unique Facts: Infected person acquires life-long immunity & Human is the only host

Rx: Date: Time:

- **Warm or cold compress for swollen salivary (parotid) gland.**
- **Syp/Tab Paracetamol 500mg (Panadol)**
  1+1+1 (if for pain & fever)

VACCINE:**(MMR Vaccination)**

- Live attenuated vaccine of measles, mumps, and rubella. Two dose
  - ➢ 1st dose: 12 – 15 months of age
  - ➢ 2nd dose: At least 28day after 1st dose

Contraindication: Pregnancy & allergy

HERPES ZOSTER (Shingles)

Definition: It results from reactivation of endogenous latent varicella zoster viral infection within sensory ganglia (dorsal root ganglia) it is usually a painful but self-limited dermatomal rash

Chief Complaint:

- Thoracic dermatomes: present with chest pain
- Burning discomfort in affected dermatomes
- Discrete vesicles appearing 3 -4 days later

Herpes zoster Ophthalmicus; Involvement of ophthalmic division of trigeminal nerve, vesicles appears over face, cornea, and may lead to corneal ulceration and in some patient also conjunctivitis, keratitis, uveitis and ocular – cranial nerve palsies

Geniculate ganglia; Ramsay Hunt syndrome facial palsy (LMN), ipsitateral taste sensation loss, rash

- Multiple dermatome involve in HIV
- Neuralgic pain/Post herpetic neuralgia
  - Light touch or brush of clothing is sometime perceived as being painful a phenomenon called Allodynia

Indication for zoster vaccine:

Age ≥50years whether they have had episodes of herpes zoster or being given live attenuated zoster vaccine or not

Rx: Date: Time:

- Aluminum acetate soaks – soothing cleaning effect
- **Tab Acyclovir 400mg (Aclova)** 2+2+2+2+2 for 5days

In Severe Case:

- **Inj. Acyclovir 250mg/vial (Aclova)**
  10mg/kg TDS (or 8th hourly) for 5-7 days

For neuralgic or neuropathic pain

- **Tab Amitriptyline 25mg (Amyline)**
  0+0+1 (25-100mg/day) for 1 month **OR**
  Cap Gabapentin 300mg (Neogab, Gabix)
  0+0+1 followed by 1+0+1 for one month **OR**
  Cap Pregabalin 75mg (Gabica)
  1+0+1 (up to 200mg TDS) for 1 month

Alternate to Acyclovir

- **Tab valacyclovir 1gm** 1+1+1 for 7days
- **Vaccine: There are 2 zoster vaccines (ZV)**
  Recombinant ZV (RZV): better because it Provides longer lasting protection than the live attenuated vaccine (LAV)

Inj. RZV 0.5mL IM in 2 doses 2-6 month apart
Inj. LAV 0.65mL S/C in the deltoid region upper as a single dose zoster vaccine should be given 14 days before immunosuppressive therapy is begin

MEASLES (Rubeola)

Chief Complaint: Incubation period 10 – 14 days

1) **Prodromal period:**
   - Fever High grade, Diarrhea
   - **3C**:**C**ough,**C**onjunctivitis, **C**oryza (Stuff nose)
   - Koplik spots (rash on mucous membrane)
2) **Exanthema period:** Red, maculopapular rash spread in cephalo-caudal progression
3) **Recovery phase:** Last for 10 – 14 days.
   - Persistent cough
4) **Bacterial Super infection**

Complication; pneumonia, Diarrhea encephalitis, and sub-acute sclerosing panencephalitis.

O/E: Vital (BP, Pulse, Spo_2%,Temp) JACKLET

- Macula Popular rash, lymphadenopathy
- Koplik`s spot +, Chest;(C/F pneumonia)
- CNS, features of encephalitis

Investigation: Serology (Measles Ab in blood serum)

Rx: Date: Time:

Diet; Increase fluid intake, isolate patient

- **Syp/Tab Paracetamol 500mg (Panadol)** 1+1+1 (if fever)
- **Inf. Plabolyte-M OR Dextrose saline 25ml/kg IV TDS**

Cap Vitamin A

1) **50K U** 1cap for 2 days for age < **6 months**
2) **1 lac U** 1cap for 2 days for age > **9months**
3) **2 lac U** 1cap for 2days for children **>1 year**

If bacterial super infection then

- **Inj. Cefotaxime (Claforan)** 100-150mg/kg/d
  In 3 divided doses **& inj Amplus** 0.3cc/kg **or**
- **Tab levofloxacin 250mg (Leflox)** BD 7 days

If Conjunctivitis: Tobramycin (Nebra) eye drop 1 drop TDS

In immunocompromised and non-immune pregnant women, and in infants

- **Inj. Pent globin** 0.25ml/kg IM stat within 6 days of exposure.

Measle vaccine: Given at 12-15 months old & 4-6 years old

CHCKEN POX (Varicella)

Definition: Extremely contagious is spread by mucosal (usually nasopharyngeal) in circulation through airborne droplets or aerosolized particles, direct contact with patient (e.g via skin fusion) Communicable from 48 hour before skin lesion appear until the final lesions crusted. Mild in children, severe in adults and pregnancy.

Chief Complaint: Incubation period; 14-21 days

- Prodromal phase; fever, headache, GBA
- Lesion appear first over mucosal surfaces followed by rapid spread in a centripetal distribution (dense on trunk, and less over limbs)
- Characteristic to see skin lesions at all stages of development on the same area of skin (macules, vesicles, pustules an crested)
- Secondary bacterial infection of skin lesion can occur due to scratching
- Chicken pox in pregnancy can produce congenital defects, in infants (mostly if infected between 8-20 weeks of gestation)
- Complication; pneumonitis, cerebellitis, transverse myelitis

On examination Vitals, JACKLET

Investigation (Diagnosis)

1) Chicken pox suspected in patients with the characteristic rash, which is usually the basic for diagnosis
2) **Tzank test or Tzank smear:** Is scraping of an ulcer to look for Tzank cell, Also called chicken pox and herper skin test
3) PCR for viral DNA

Note: Acyclovir safe in pregnancy

Rx: **Date:** **Time:**

- **Isolation of patient** (contagious disease)
- **Bed Rest and Diet;** Increase fluid intake
- Tepid water baths and wet compress are better than drying lotion for relief of itching

Anti-viral therapy indication

1) Patient present within 24-48 hours of vesicles onset
2) Patient with complication
3) Immunocompromised **4)** Pregnant women

- **Tab Acyclovir 400mg (Aclova)** 2+2+2+2+2 for 5 – 7 days
  If patient can`t able to take oral drug
  Inj. Acyclovir 10mg/kg TDS for 5 – 7 days
- **Tab Paracetamol 500mg (Panadol)**
  1+1+1 (for fever)
- **Tab fexofenadine 60mg (Fexet)**
  1+0+1 for 5days

Treatment in children:

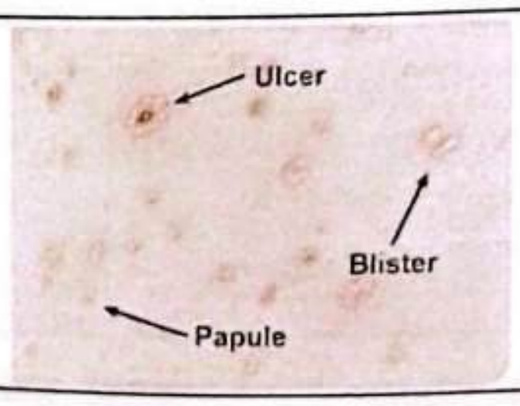
Syp Paracetamol (Panadol) 1 tsf TDS
Syp Cetirizine (Zyrtec) half TSF OD at night
Syp Acyclovir (Acylex) [20mg/kg/day] in 4 divided doses (or QID) **1 TSF= 200mg**

Vaccination

1) Two doses of varicella vaccine (0.5mL)

Contraindication for vaccination

- ✓ Patient with occults febrile illness
- ✓ Immunocompromised for a chemotherapy
- ✓ If patient receive blood transfusion delayed vaccination for 2 months
- ✓ Pregnancy or might because pregnant within 4 weeks



INFECTIOUS MONONUCLEOSTS (IMN)

Definition: Infectious mononucleosis (IMN) is caused by Epstein-Barr virus in 90% and is characterized by fatigue, fever, pharyngitis, and lymphadenopathy. about 3%-7% of cases by cytomegalovirus

- Adenovirus and Toxoplasma gondii (toxoplasmosis) infections can cause symptoms similar to IMN and Adult onset stills disease also mimics. **Spread:** Droplet, Saliva (Kissing-Kissing disease)

EBV is the cause of heterophile-positive infectious mononucleosis (IM): which is characterized by fever, sore throat, lymphadenopathy Glandular fever), and atypical lymphocytosis.

Chief complaint:

- Fever, Chills
- Sore threat /Pharyngeal inflammation
- Fatigue: Persist (May be up to 6 months)

O/E: Vitals (Pulse, BP, Temp) JACKLET

- Lymphadenopathy: especially posterior cervical, Splenomegaly, hepatomegaly
- Petehiae, peri-orbital edema

Note: A generalized maculopapular, urticaria or petechial rash is occasionally seen. Rash almost always occurs following the administration of ampicillin or amoxicillin so avoid it

- ✓ Mononucleosis is sometime accompanied autoimmune hemolytic anemia

Investigation:

1) **Monospot: Positive** (Heterophile antibodies)
2) **CBC:** Lymphocytosis, defined as an absolute count >4500/microL or, on peripheral smear, a differential count >50%.
3) **Peripheral smear:** Atypical lymphocytes: significant atypical lymphocytosis, defined as >10% of total lymphocytes.
4) Atypical lymphocytes may also be found in patients with toxoplasmosis, rubella, roseola, viral hepatitis, mumps, CMV, acute HIV infection, and some drugs (phenytoin, carbamazepine, isoniazid, minocycline)
5) **SGOT, SGPT:** Mild elevation
6) **Immunological tests;**
7) **Paul Bunnell test / monospot test, ELISA**

Common Complication

Acute pharyngitis, Chronic fatigue syndrome

Rx: **Date:** **Time:**

- **Analgesics, drink plenty of fluid, avoid Alcohol**
- **Tab Paracetamol (Panadol, Calpol)**
  1+1+1 (to control fever)
- Inf NS 500 ml IV TDS
- **Inj. Esomeprazole 40mg (Nexum, Ezomol)**
  1 vial IV stat and OD
- **Tab Multivitamin (vitrum, Chewcal)**
  1+0+0 - 1 month
- **If Pharyngeal edema:** Short Course of steroids
  Inj. Dexamethasone 1.5cc IV OD

Otherwise, Steroids have got minimal role in IMN. but we can give

Uncommon complications	
Neurological	Usually occurs during the initial 2 weeks of EBV infection • Meningitis and encephalitis • Polyneuritis. Cranial nerve palsies, Transverse myelitis • Cerebellar ataxia.
Hematological	• Red-cell aplasia, severe Granulocytopenia, thrombocytopenia, pancytopenia, and HHS • AH anemia (2%) • Splenic rupture (<0.5%)
Kidney disease	• Glomerulonephritis • Interstitial nephritis
Heart disease	Pericarditis, pericardial effusion, Myocarditis
Lung disease	Interstitial pneumonia

FEBRILE NEUTROPENIA

Definition: when there is a Single oral temp ≥ 101 °F, or a temperature ≥ 100.4 °F for at least an hour,

- With an absolute Neutrophilic count (ANC) of less than 1500 cells/microliter.

Neutropenia classification:

- **Absolute neutrophil count (ANC)**; ANC is the number of neutrophils plus bands, but does not include metamyelocyte & less mature forms.
- ANC = WBC (cells/mm³) x percent (PMNS + bands)

Neutropenia can be categorized as

- **Mild ANC** ≥1000 and <1500 cells/mm³
- **Moderate ANC** 2500 and <1000 cells/mm³
- **Severe - ANC** <500 cells/mm³
- **Agranulocytosis- ANC** <200 cells/mm³ ANC

- In severe neutropenia, the ANC < 500 per microliter or ANC that is expected to decrease below 500 cells/microL in the next 2 hours.
- In profound neutropenia, the ANC < 100 cells/microliter. To calculate ANC, multiply the total white blood cell (WBC) count by the percentage of polymorphonuclear cells (PMNs) & band neutrophils.

- The majority of infections are bacterial, but viral or fungi! Etiology is possible.
- Common bacterial pathogens include gram-positive bacterial infections such as Staphylococcus, Streptococcus, and Enterococcus species.
- Drug-resistant organisms, including Pseudomonas aeruginosa, Actinobacter species, S.maltophilia

ANC	Clinical Significance
>1500	Normal
1000-1500	Less chances for infection
500-1000	Possibility of infection.
<500	High chances of infection. Few clinical signs of infection may present. Treatment with IV antibiotics
<200	The inflammatory process will be absent.
ANC; Absolute Neutrophil Counts	

On Examination:

- Vitals, JACKLET

Investigation:

1) **CBC, ESR, RBS, s electrolyte, RET, LET**
2) **Bone marrow Study**:

Reduce bone marrow cellularity or myeloid arrest at the myelocyte or metamyelocyte Stage indicates decreased bone marrow ability)

Rx: Date: Time:

- **Maintain ABC** (airway, breathing, Circulation), Bed rest
- **Diet**: Rigorous oral hygiene - oral antifungal agent, chlorhexidine mouth wash.

In low risk patient (outpatient Setting)

- **Tab Co-amoxiclave 625 mg (Augmentin)**
  1+1+1 - 7 days.
  If penicillin allergic then use clindamycin

In high risk patient: IV antibiotic should be given with in 1st hour and monitor > 4 hour before discharge

- If patient remain febrile for 48 to 72 hour, then patient will require admission.
- **Inj. Meropenem 1gm** 1 vial IV stat & TDS
- Inj. Gentamicin

If suspect catheter related infection, skin or soft tissue infection pneumonia: MRASA resistance then Vancomycin
Antifungal

MASCC: Scoring for severity Of Febrile NEUTROPENIA:

Characteristic	Weight
Burden of febrile neutropenia with no or mild symptoms	5
No hypotension (systolic blood pressure more than 90 mmHg)	5
No chronic obstructive pulmonary disease:	4
Solid tumor or hematologic malignancy with no previous fungal infection	4
No dehydration requiring parenteral fluids	3
Burden of febrile neutropenia with moderate symptoms	3
Outpatient status	3
Age less than 60 years	2
Abbreviation MASCC Multinational Association for Supportive Care in Cancer Maximum score is 26, scores > 21 indicate a low risk for medical complications Data adapted	

Colony stimulating factors (CSF):

- Granulocyte CSF (G-CSF)-Filgrastim 5 mcg/kg/day SC injection
- Stimulate the production WBC following chemotherapy/ drug induced neutropenia.
- Treatment duration; usually 14 days, or Continue until ANC is 10,000//mm3
- Also indicated for reducing the time to neutrophil recovery & the duration of fever, following induction or consolidation chemotherapy treatment of adults with Acute myeloid leukemia
- For Cancer Patients Receiving Bone Marrow Transplant : after BMT dose is 10 mcg/kg/day given as an IV infusion of 4 or 24 hours, or as a continuous 24-hour SC

Recommendation for prevention of infection in neutropenic patients:

- Fluroquinolones as prophylaxis for patients who are high risk
- Antifungal prophylaxis with an oral triazole with patients with profound neutropenia
- Trimethoprim-sulfamethoxazole (TMP-SMX) is the recommended treatment for patients receiving chemotherapy regimens associated with greater than 3.5% risk for pneumonia from Pneumocystis jirovecii
- Yearly influenza vaccination; for all patients receiving chemotherapy
- Treatment with a nucleoside reverse transcription inhibitor is recommended for patients who are at high risk of hepatitis B virus reactivation

ACUTE DIARRHEA

Viral diarrhea

- Most common cause of acute diarrhea
- Symptoms are Fever (Temp > 38 °C or 100.4 °F). Watery diarrhea, vomiting, abdominal pain, loss of appetite, headache, muscle aches
- Vomiting predominant features caused by norovirus

Parasitic infection (uncommon)

- Common in area where there is unsafe drinking, water & Poor handling of sewage
- Diarrhea may last for works to months

Anti-biotic associated diarrhea

Usually resolves 1 or 2 days after antibiotic finished

Bacterial diarrhea

- Persistent high-grade fever (>40 °C or 104°F) & diarrhea that contains blood or mucus
- Bloody diarrhea (dysentery) causes are

NON-Infectious:

Inflammatory bowel disease (IBD), Anal fissure

INFECTIOUS:

- Campylobacter jejuni, Shigella dysentery
- Enterohemorrhagic E. coli (EHEC)
- Entero-invasive E. coli (EIEC)
- Non-typhoidal salmonellae/Clostridium difficile
- Vibrio parahaemolyticus
- Entamoeba histolytica (amoebic dysentery

ACUTE WATERY DIARRHEA

Chief Complaint:

- Frequent passage of loose Stool
- Abdominal pain or tenesmus
- Fever

History: Any history of taking unhygienic food

Any drug History

O/E:

- Vitals, JACKLET
- Look for dehydration

Investigation

1) CBC,
2) Serum electrolyte
3) RFTS
4) Stool R/E

Fluid in acute watery diarrhea;

Normal slaine

Ringer lactate

Cholera saline

Rx: **Date:** **Time:**

- **Diet**: Increase fluid intake, carbohydrate and electrolytes
- Rehydration (ORS Sachet)

If no dehydration

ORS: 1 sachet after each purgation

If some dehydration

ORS: 75ml/kg in 4 hours e.g., 60kg pt. needs 4500ml ORS (400ml water + 9 sachet of ORS)

If severe dehydration.

Inf. Cholera saline or NS IL 30 ml/kg IV in 30 mins followed by 70 ml/kg IV in 2 hours

- **Racecadotril sachet 30mg (Hydrasec Sachet).**
  1 Sachet in 1 glass of water stat & TDS

Injectable in ER or if Systemic upset like fever, bloody diarrhea, or with severe comorbidity:

- **Inj. ciprofloxacin 400mg / 100ml (Cipro)** 1 bottle IV stat & BD
  (If pregnancy Then Ceftriaxone 1gm IV BD)
- **Inj. Metronidazole 500mg/100ml (Flagyl)** 1 bottle in Stat & TDS
- **Inj. Ondansetron 8mg/4ml (onset)** 1 amp IV Stat and TDS
- **IV fluid (NS & RL)** according dehydration and BP status

Specific Rx: According to the diagnosis

TRAVELER'S DIARRHEA:

RX: Tab Rifaxamin 200mg (Rifixa) 1+1+1 3 days

(Not effective in diarrhea with fever or blood or caused by C. jejuni)

AMOEBIC DYSENTRY

Chief Complaint:

- Diarrhea alternating with constipation and mucous in stool
- Abdominal pain (especially in RLQ)
- Dysenteric presentation with blood, stimulating bacillary dysentery or ulcerative colitis occur in older people

O/E: Vitals (pulse, BP, Temp), dehydration

Investigation:

1) **Stool RE :** Motile trophozoites Containing RBC
2) **ICT for Entamoeba histolytica**
3) **CBC, RBS**, Serum electrolyte, RFTS

Rx: **Date:** **Time:**

- **Tab Diloxanide + Metronidazole 500mg/400mg (Entamezole DS)**
  1+1+1 - 5 to 10 days **OR**
  Tab Metronidazole 400mg (Flagyl, Riam)
  1+1+1 - 5 to 10 days **OR**
  Tab Tinidazole 500mg (Fasigyn)
  2+0+2 - 3 days **OR**
  Tab ornidazole 500mg
  1+0+1 - 3 days
- **ORS sachet;** 1 sachet in 4 glass of water
  Finish within 24 hours

CHOLERA

Chief Complaint:

- Severe diarrhea, Vomiting
- **Hx:** Travel to Endemic area or Living in Endemic

O/E: Vitals (pulse, BP, Temp)

- Dehydration (based on WHO Classification)

Investigation:

1) **CBC, Serum electrolyte, RFTs**
2) **Stool R/E**(Shooting star motility of Vibrio cholera)

Monitor:

- Input, output records and Vitals

Antibiotic in Children:

Erythromycin 12.5mg/kg 6 hourly for 2 days or
Azithromycin 20mg/kg, in single dose

Note: Giving only clear liquids (in any diarrhea) for Several days can actually prolong diarrhea (called "starvation Stools)

RX Time: Date:

- **Diet:** Fluid intake, carbohydrates & electrolyte
- ORS sachet one sachet in 4 glass of water

IV Fluids (NS, RL, cholera saline)

- **Inf. NS 0.9% IL** IV TDS or
  If severe dehydration; 50-100ml/kg/hour
  (150-200ml IV Continuous)
- **Inj. Ondansetron 8mg/4ml (onset)** IV stat and TDS.

Antibiotics:

- **Cap Doxycycline 100mg (Vibramycin)**
  3 Cap stat (single dose) **OR**
- **Tab ciprofloxacin 500mg (Cipro)**
  2 tab stat (single dose) **OR**
- **Tab Azithromycin 500mg (Azitma, Zygrel)**
  2 tab Stat (Single dose)

If Pregnant:

- **Tab Erythromycin 500mg (Erythrocin)**
  1+1+1+1 - 3 days OR
  Tab Azithromycin 500mg (Azitma, Zygrel)
  2 tab Stat (Single dose)
- ORS after each purgation

BACILLARY DYSENTERY

Chief Complaint:

- Diarrhea with blood and purulent exudate
- Abdominal pain, tenesmus, fever

O/E: Vitals, Dehydration Tenderness over colon: +

Investigation:

1) CBC, Serum Electrolyte
2) RFTS, Stool R/E

Rx: Date: Time:

- **Diet:** Fluid intake, carbohydrates & electrolyte
- ORS sachet: one sachet in 4 glass of water
- **Tab ciprofloxacin 500mg (Cipro)**
  1+0+1 - 5 days
- **Tab Azithromycin 500mg (Azitma, Zygrel)**
  2 tab Stat
- **Tab Diloxanide Furoute /Metronidazole**
  500mg/400mg (Entamezole DS) 1+1+1 or
  Tab Metronidazole 400mg (Flagyl) 1+1+1 5days

CLOSTRIDIUM DIFFICILE

Chief Complaint:

- Diarrhea which occurs with antibiotic use
- Diarrhea, abdominal Pain

O/E: vitals, Dehydration

Investigation: **Stool C/S:** (+ Stool test ins for difficile)

Rx: Date: Time:

- Stop antibiotic causing diarrhea
- **Tab Fidaxomicin 200mg (Dificid)** 1+0+1 — 10 days
- **Tab/cap Vancomycin 125mg** 1+1+1+1 - 10 days
- **Tab Metronidazole 500mg (Flagyl)**1+1+1 - 10 days

Risk with: Clindamycin, fluroquinolones, (cephalosporin, carbapenem

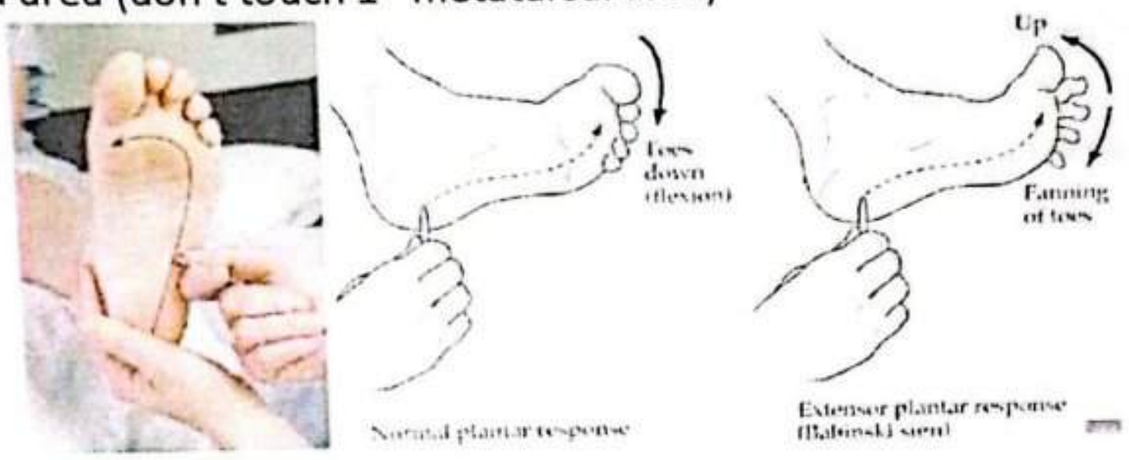
Neurology

BABINSKI'S SIGN:

Babinski's sign; The big toe extends (Dorsiflexion) or plantar extension

- Upward movement of the great toe is pathological, caused by contraction of the Extensor Hallucis longus (EHL) muscle. Contraction of the EHL muscle occurs synchronously with Reflex activity in other flexor muscles.

Examination: The examiner Strokes the patient's foot starting laterally at heel, & moving up and crossing medially at metatarsal head area (don't touch 1st metatarsal area)



Variants:

- **Equivocal Babinski:** No response to plantar stimulation.
  - Occurs when there is a lesion causing paralysis of extensors of flexors of big toe
- **Minimal Babinski**: If there are no movements of toes, the response can be assessed by feeling for contraction of tensor fascia lata and adductors of the thigh

Alternative methods:

- By stroking the lateral malleolus (Chaddoek's sign); Squeezing the calf muscle (Gordon's sign)
- Applying pressure along the shin of tibia (Oppenheim sign)
- Pressing the 4th toe, downwards and then releasing it with a snap (Gonda's Sign)
- Squeezing the Achilles tendon (Schaefer's sign),
- "Flexion of the toes, on quick percussion of the tips of the patient's toes with the finger-tip (Rossolimo's sign);

Babinski Sign seen in: Pyramidal tract lesion, Deep sleep / anesthesia, Alcoholic intoxication Post Convulsion stat, Narcotic overdose and Infancy

Kernig's Sign: Flex the hip joint, then extend the knee joint, it is impossible to straighten the Knee due to spasm of hamstrings, this mainoeuvre Stretches roots of the sciatic nerve which are inflamed at their exists from the spinal theca

Brudzinsk's neck sign: on passively flexing the neck, both legs flex at Hip, and knee.

Brudzinski's leg Sign: on passively flexing one lower link, the other leg also get flexed.

STORKE

Definition: Also called Cerebrovascular accident (CVA), Abrupt onset of a neurological deficit that is attributable to a focal vascular cause. (Neurological sign and symptoms last for > 24 hours)

CAUSES:

- Ischemic stroke (85%)
- Embolic Stroke (75% of ischemic Stroke) Thrombotic Stroke (25%. of ischemic stroke)
- Hemorrhagic Stroke (15%)

➢ **In young age:** Valvular heart disease, After Valvular malformation, rupture berry aneurism

➢ **In old age:** Hypertension, Diabetse Melliteus, Ischemic heart disease

DDS (Differential Diagnosis):

❖ Syncope, Hypoglycemia, migraine headache, demyelination, Encephalitis and focal seizures, Todd's paresis (weakness after epileptic seizures)

Prognosis (Hemorrhagic stroke):

- Supratentorial Hematomas with Volume >30 ml have good prognosis.
- 30-60 mL Have intermediate prognosis. And > 60ml have poor prognoses.

Hemorrhagic/Thrombotic/ Embolic strokes

	Hemorrhagic	Thrombotic	Embolic
Onset	During activity	Any time	Any time
Progression	Over minutes	Over hours	In seconds
History of TIA	--	Present	-/+
Headache/Vomiting	+++	+/-	+/-
Neck stiffness	+++	--	--
Resolution	Late	Variable	Early
Carotid bruit	--	+	-/+
Valvular Heart Disease/ Atrial Fibrillation	--	----	++
Hypertension	++	+/-	–
Convulsion	++	+/-	

Ischemic CVA CT

Hemorrhagic CVA CT Scan

Imaging Studies

➢ **CT SCAN:** To detect type of stroke Noncontrast CT can detect hemorrhages (best initial in stroke)
- CT Scans obtained in 6(may be up to 24-48) hours of an ischemic infarction generally show no abnormality

➢ **MRI:** (most accurate test) MRI can detect the extent and location of infarction in all areas of the brain, Including the posterior fossa and cortical surface. It also identifies intracranial hemorrhage and other abnormalities but is less sensitive than CT for detecting acute blood,

➢ **Digital subtraction angiography (DSA)**: to detect vascular lesions, including occlusions, stenosis, dissections, and aneurysms.

➢ **Carotid Doppler scanning**: To detect carotid stenosis **& Echo, ECG** in cardiac embolism

Recombinant Tissue Plasminogen Activator (rtPA)

- Thrombolysis: within 4 .5 hour of onset of stroke sympotms
- Do a Non-contrast head CT within 20 minutes to rule out Intra cranial bleed
- Inj Actilyte (Alteleptase) 50mg mix with 50ml NS; Give 5ml Iv over 2 minute then 45ml over 1hour
- Aspirin is recommended in acute ischemic stroke patients within 24-48 hours after stroke onset. For patients treated with IV tPA, aspirin Initiation is generally delayed for 24 hours.
- Frequent blood pressure monitoring , and Avoid urethral catheterization for 2 hours

Indication	Contraindication
• Age 18 years • Clinical diagnosis of ischemic stroke • Onset of symptoms <4.5 hour • If the exact time of stroke onset in not known, onset may be defined as the last time the patient was known to be normal • Non-contrast CT scan showing no hemorrhage or edema of >1/3 of the MCA territory	• Sustained BP>185/110 despite treatment • Platelets <100,000 • Blood glucose <50 or >400 mg/dL • Use of heparin within 48 h and prolonged APTT/PT-INR • Rapidly improving symptoms • Prior stroke or head injury within 3 months, prior intracranial hemorrhage • Major surgery in preceding 14 days • Gastrointestinal bleeding in preceding 21 days, Recent MI and Coma or stupor

Control of BP in Ischemic Stroke:

- For thrombolysis before lytic therapy, antihypertensive should be started with target BP ≤ 185/110 mm Hg. (≤ 180/110)
- The BP should be <180/105 mm Hg for Atleast 24 hour after IV tPA treatment
- In Ischemic CVA control BP with LABETALOL if BP > 220/120 OR MAP >130
- Inj. Labetalol 50mg/10ml 4ml(20mg) IV Current recommendations are to lower MAP <130

BP Control in Hemorrhagic Stroke:

- For patient with acute bleed with Systolic BP 150 to 220 mm Hg, acute lowering of Systolic BP to 140 mm Hg is recommended.
- For patient with acute bleed with Systolic BP >220 mm Hg, aggressive reduction of BP with continuous IV infusion antihypertensive medication (i.e. labetalol) to SBP of 140 to 160 mmHg is a reasonable target.
- For patient with MAP > 150 mm Hg, also consider aggressive reduction of BP with continuous IV infusion of Anti-hypertensive to lower MAP <130 mm Hg. IV Labetalol. 20mg every 15 minutes, then infusion 2 mg per minutes (Maximum 300 mg/day).

Treatment of HTN in Stroke: For known hypertensive patient. Continue the antihypertensive whether the BP is normal or high.

- If patient is not known to be hypertensive and BP is mildly or moderately high monitor BP for 7 to 10 days after This Period if the BP is still high, anti-hypertensive should be considered.
- Though the patient is not known to be hypertensive, antihypertensive drugs should be started if 1) Evidence of target organ damage (See Hypertension emergency portion) 2) BP > 220/110 mm Hg. And Co-morbidity e.g. MI

Transient Ischemic attack (TIA)

Chief Complaint:

- Same like stroke but symptoms last for < 24 hours (but usually < 30 minutes), and resolves completely
- Once patient has TIA there is high risk of stroke in subsequent months

O/E: Vitals (pulse, BP, SPO2%, Temp, RR)

Investigation:

1) **CT brain;** to rule out bleed and ishemic changes
2) **MRI brain**
   - **Low risk patient;** within 1 week of symptoms onset
   - **High risk patient;** within 24hours of onset
3) **Carotid Doppler**
4) **Cardiac workup;** Should be closely investigated

Rx: **Date:** **Time:**

Loading dose; For all TIAs regardless of ABCD score
Tab Aspirin 300mg (Ascard) Stat
Clopidogrel 75mg (Lowplat) 4 tablets stat then for
Low risk Patient ABCD2 Score < 4; start single antiplatelet
Tab Aspirin 75mg (Ascard, Loprin) 1 tab daily continue
High risk Patients; ABCD2 ≥ 4; Dual antiplatelet
Tab Aspirin+ Clopidogrel 75/75mg (Ascard plus)
1 tab daily for 21 days then switch to
Tab Aspirin 75mg (Ascard, Loprin) 1 tab daily continue
If Atrial fibrillation on ECG: Add anticoagulant
Amaurosis fugas (an example of TIA): Transient, curtain like loss of sight in ipsilateral eye due to micro emboli to the retina

ABCD2 Prognostic score for risk assessment of stroke

	CLINICAL FACTORS	SCORE
A	AGE > 60 years	1
B	Blood pressure ≥ 140/90	1
C	**Clinical** features Unilateral weakness Speech disturbance without weakness	 2 1
D 1	**Duration** >60 minutes 10-59 minutes	 2 1
D 2	Diabetes	1

ABCD2 SCORE and 3-months Stroke risk

ABCD2 Score	Stroke Risk (%)
0	0%
1	2%
2	3%
3	3%
4	8%
5	12%
6	17%
7	22%

Low risk patient; ABCD2 Score < 4
High risk Patient; ABCD2 Score ≥ 4

Life style meodification;
Regular exercise, weight loss, stop smoking, healthy diet

ISCHEMIC STROKE

Chief Complaint:

(Remember FAST)

- Facial asymmetry
- Arm weakness
- Speech difficulty (or slurred speech)
- Timing: Sudden onset

Past Hx: DM, HTN, IHD, Valvular heart disease

Right side or left side weakness

Drug Hx: if any.

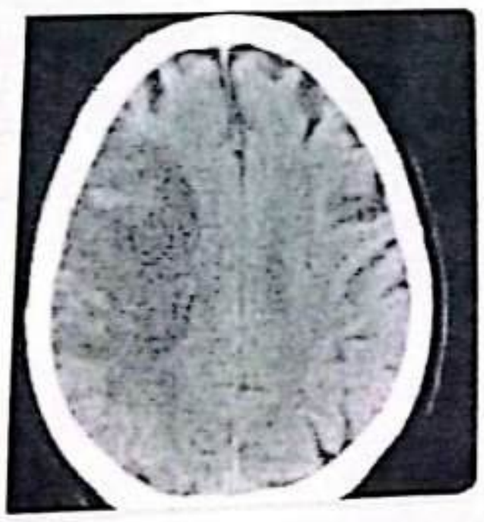
O/E:

Vitals, JACKLET, CNS examination

- ➢ Muscle tone ↑ on affected Side
- ➢ Jerks, planters, Neck rigidity
- ➢ Signs. Kerning's Sign, Hoffman's Sign
- ➢ Cerebellar sign
- ➢ Cranial nerve examination

Investigation:

1) **CT Scan of brain:** Hypodense lesion on CT (MRI with DWI Scan if presented after 7 days)
2) RBS
3) Serum creatinine and lipid profile
4) ECG, Echo (Echocardiogram)
5) CBC with ESR



Rx: **Date:** **Time:**

- **Maintain** Airway, breathing and circulation
- **Thrombolytic therapy**: if no contraindication & patient come within 4.5 hours of onset of symptoms
- **Bed rest:** physiotherapy, change posture 2 hourly, chest physiotherapy 3 times daily
- **Pass NG** (if Gag reflex not intact or unconscious Patient)
- **Pass catheter** (If acute retention or incontinence)
- **Diet:** NG feeding 200ml 2 hourly in sitting posture and maintain posture for 30 minutes.
- **Inf. NS IL** IV @ 10drop/min **or** 500ml IV TDS
- **Tab Chewable Aspirin (Disprin) 300mg**
  1 tab stat within 1st 48 hours
- **Tab Atorvastatin 20mg (Lipiget)** 0+0+1
- **Inj. Omeprazole 40mg (Risek)**
  1 vial IV Stat and then OD

If fever: Paracetamol infusion or tablet

If Diabetic or high RBS:

- **Inj. Insulin R 8 units SC TDS**

Keep Blood glucose between 140 to 180mg/dl

If Patient can't close his/ her eyes.

- **Artificial tears (Tear Plus, Tearkool, Hyspa) Eye drops**
  2 drops each eye TDS

Anti-HTN:

Continue if taking regularly previous Anti-HTN

Reduce BP if ≥ 220/120

For more details See HTN urgency & emergency Topic

- ➢ If diabetic Glucerna powder.
- ➢ If non-diabetic Ensure powder (2tsf every 4 hour)

Note: if Aspirin contraindicated. Then

Tab Clopidogrel 75mg (Plavix) 0+1+0

Treatment on discharge

- **Tab Cefexime 400mg (Cefiget)** 1+0+1 10 day [if having infection)
- **Tab Disprin 300mg (Ascard)** 1+0+0 for first 14 days then **Disprin 75mg (Ascard)** 1+0+0 continue
- **Tab Atorvastatin 20mg (Atorva)** 0+0+1 at night Continue [**or** tab Rosuvastatin 10mg (Rast) OD at night]
- **Cap Esomeprazole 40mg (Nexum)** 1+0+0 30 mins before breakfast 14 days.
- Advice physiotherapy

HEMORRHAGIC STROKE

Chief Complaint:

1. **Remember FAST**
   Facial asymmetry, **A**rm weakness, **S**peech difficulty, **T**iming: Sudden onset
2. Sudden, Severe headache Thunderclap headache), Vomiting, seizures, papilledema, loss of Consciousness
3. History of 2nd, 3rd, 4th, 5th cranial nerve involvement due to compression by the aneurysm before it ruptures
4. Extension into the ventricular systems location within the posterior fossa, depressed level of consciousness at initial presentation advance age have a worse prognosis

Past Hx: DM, HTN, IHD, Compliance of medication (Anti-HTN medication)

O/E: Vitals (Pulse, BP, SPO2%, Temp, RR)

- GCS: < 8 may need ET intubation
- Neck stiffness in SAH intra ventricular extension and Blood in CSF study

Investigation:

1) **CT brain:** Hyper-dense lesion on CT
2) **CBC, RFT**, S.electrolyte, RBS, Lipid profile
3) **Fundoscopy**
4) **LP** (if Fundoscopy normal): To rule out meningitis or SAH when CT scan is negative , Almost 100% Sensitive after 12 hours,

BP Target: (Reduce BP IF)

If SBP > 220mm Hg and MAP > 150mm Hg then

- **Inj. Labetalol 50mg/10ml**

4ml (20mg) IV over 2 min Stat
repeat if needed 4ml to 8ml over 10 min
Target Bp. 140 to 160mm Hg & MAP < 130

Rx: **Date:** **Time:**

- **Maintain** Airway, breathing, circulation
- **Bed rest:** Physiotherapy, change posture 2 hourly
- **Pass NG** (if Gag reflex not intact or unconscious Patient)
- **Diet:** NG feeding 200ml 2 hourly in sitting posture and maintain posture 30 minutes.
- **Pass catheter:** If acute retention or incontinence
- **Inj. Mannitol 250ml IV stat & TDS** OR
  Initial bolus: 0.5 to 1g/kg IV stat
  followed by 0.25 to 0.5 g/kg TDS
- **Inj. Ceftriaxone 1gm (Oxidil, Rocephin)**
  1 vial IV Stat & BD (After test dose)
- **Inj. Valproate sodium 500mg/5ml (Epival)**
  1 vial IV stat & BD (if fits/seizures present)
- **Inj. Omeprazole 40mg (Risek, Ruling)**
  1 vial in stat and OD

If ventricular extension/SAH: Add

Tab Nimodipine 30mg (Nimotop)
2+2+2+2+2+2 (300-600mg/day) for 21 days
Tab Domperidone 10mg (Motilium) TDS

Insulin: If Diabetes mellietus + or RBS high
Inj. Insulin R 8 unit S/C TDS

If Patient is irritable:

Inj. Haloperidol 5mg (Serenace) IV stat & SOS **OR**
Haloperidol drop(Dosik drops) 1.5CC orally SOS

Other Treatment:

- **For fever:** Paracetamol infusion or tablet
- **Miconazole oral gel** 10gm (Macnaz oral gel) Apply on oral cavity TDS
- **If Patient can't close his/her eyes:**
  Artificial tears (Tear Plus, Tearkool, Hyspa) Eye drops
  2 drops each eye TDS
- **If Diabetic:** Glucerna powder
- **If non-diabetic:** Ensure Powder

SUB ARACHNOID HAEMOPRHAGE (SAH)

Chief Complaint:

- Sudden Severe thunderclap, worst headache of life
- Symptom of Meningism (meningeal irritation sign) Vomiting, nausea, Photophobia and neck stiffness
- Sudden loss of Consciousness
- Epileptic Seizures, Focal neurological Symptoms (dysplasia, hemi sensory / Motor symptoms
- Focal deficit frequently absent

Past Hx: Family History of any AV malformation DM, HTN, IHD, Polycystic kidney disease, Connective tissue disease, smoking, alcohol, and drug abuse (cocaine).

O/E: Vitals (pulse, BP, SPO2%, Temp, RR) GCS

- Fundoscopy: Sub hyaloid hemorrhage
- CNS: Marked neck stiffness

➢ **Kerning's Sign, Brudzinski's sign**

➢ **History of:** 2nd, 3rd, 4th. 5th cranial nerve involvement due to Compression by aneurysms before it rupture

➢ 3rd never palsy (diplopia if PICA aneurysm before rupture)

➢ Focal neurological Sign (Hemiparesis)

➢ Sign of ↑ intracranial pressure (HTN, bradycardia)

Investigation:

1) **CT Brain:** Positive in 95% cases: If negative or normal proceed to
2) **LP:** (done after 12hrs of onset of symptoms) Look for red blood cell, or xanthochromia
3) **Cerebral angiography:** If CT scan or LP Positive To determine source of bleed or aneurysmal detection
4) **For Diagnosis of SAH**
   CT brain, LP , CSF Study and MRI brain
5) **For a etiology/Identify source**
   CT/MR angiography, DSA
6) CBC, Cardiac enzymes, ECG, RFTS
7) **Serum electrolyte:** Hyponatremia due to SIADH (imbalance caused by vomiting)

Rx: **Date:** **Time:**

- **Maintain ABC** (airway, breathing, circulation)
- **Endotracheal intubation:** If the Patient having low GCS or depressed consciousness or unable to protect airway
- **Pass catheter:** If acute retention/incontinence
- **Diet Pass:** NG, feed Via NG in Sitting posture, maintain Posture for Atleast 30 mins
- **Inj. Omeprazole 40mg (Risek, Ruling)**
  1 vial IV stat and BD
- **Inj. Ceftriaxone 1gm (Oxidil, Rocephin)**
  1 Vial IV stat & BD (After test dose)
- **Tab Nimodipine 30mg (Nimotop)**
  2+2+2+2+2+2 (300-600mg/day) for 21 days
- **Tab Cilostrazol 100mg (Pletal)**
  1+0+1 for 21 days
- **Inj. Ketorolac 30mg/ml (Toradol) IV** SOS
- **Syp Duphalac** 2 tsf TDS (in case of constipation)
- **Inf. Paracetamol 1g (Folgan, Provas) IV** (In case of fever)

If Seizure present: Then

- **Inj Levetiracetam (Lerace) 500mg** IV BD

If Hyponatremia due to SIADH:

❖ Never treat it by fluid restriction

❖ Hypervolemia should be maintain by normal saline to counter Vasospasm

BP management:

- Target Systolic BP: 130 to 140mm Hg
- If BP ≥ 180/110: decrease it with

Inj. Labetalol 50mg/10ml 4ml (20mg) iv over 2 min: repeat if needed 4ml to 8ml in 100ml pladyx to prevent rebreeding & maintain cerebral Perfusion pressure

- **Inj. Ceftriaxone 1gm (Oxidil)** IV Stat & BD
- **Miconazole oral gel** 10gm (Macnaz oral gel)
  Apply on oral cavity TDS
- **If Patient can't close his/her eyes:** Add **Artificial tears (Tear Plus, Tearkool, Hyspa) Eye drops**
  2 drops each eye TDS
- **If Diabetic:** Glucerna powder
- **If non diabetes:** Ensure powder

Refer to neurology unit: If aneurysm present (defect on CT angiogram or DSA)
Endovascular coiling or Neurosurgical clipping

INTRACRANIAL BLEED (ICB)

CHIEF COMPLAINT;

- Vomiting, Headache
- Alter sensorium
- Right or left side weakness
- Past history; Hypertension

O/E;

- Vitals; pulse, Bp, Spo2, RR
- GCS

Investigation;

1. **CT Brain;**
   Hyperdensities/bleed
2. **Base line investigation, 2Decho**
3. **In case of cortical bleed; advised**
   - **CTA; CT Angiogram**
   - **CTV; CT Venogram**

Find ICH score;

		Score
GCS	3-4	2
	5-12	1
	13-15	0
ICH	≥30cm2, ml	1
	< 30 cm2, ml	0
IVH	Yes	1
	NO	0
Age	≥ 80 year	1
	< 80 year	0

GCS; Glassgow coma scale
ICH; intracranial hemorrhage volume
IVH; Intraventricular hemorrhage

SCORE	MORTALITY
1	13%
2	26%
3	72%
4	97%
5	100%

RX; TIME; DATE;

Maintain ABC (airway, breathing, circulation)

FOR BP control;

- **Inj Labetalol 50/10ml**
  20mg/4ml IV stat and SOS
- **Inj Hydralazine 20mg IV Stat and TDS**
- **Tab Doxazosin (Cardura) 4mg** 1+0+1
- **Keep BP < 140/90 mmhg**

For headache, reduce intracranial hypertension, edema;

- **Tab Topiramate (Hitop) 25mg** 1+0+1

If fits/seizure or prophylitically;

- **Inj Leveteracietam (Ierace)** 500mg IV BD

Note;

- ✓ Keep BP < 140/90 mmhg
- ✓ With hold anticoagulant and antip30mklatelet if using any

If there is complication;

❖ **ICB with ICP; Increase intracranial pressure;**

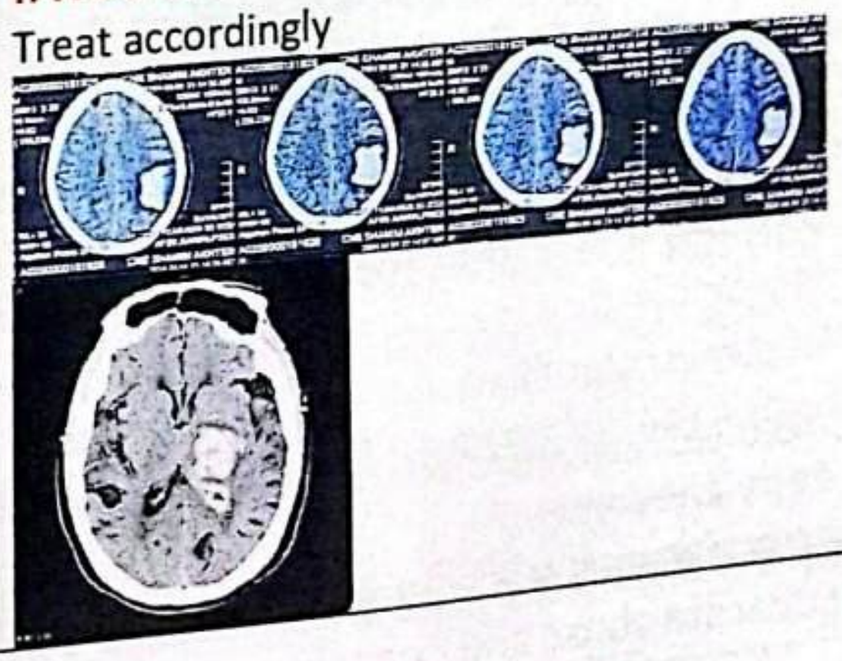
- Head elevation to 30 degree
- Hyperventilation to paco2 of 30-35mmhg
- **Inf Mannitol 20%** (1-1.5g/kg)
  Inj Mannitol 200ml IV stat

❖ **ICB with hydrocephalus or mass effect;**

- Inf Mannitol, hypertonic saline
- Neurosurgery review for EVD placement (external ventricular drainage)

If fever or chest infection/aspiration

Treat accordingly



STROKE IN YOUNG PATIENT

Defenation; Young stroke mean stroke occurring in person <40 years of age. Comprising 10-15% of all stroke patients
Risk factors; The three most frequent risk factors were current smoking (49%), dyslipidemia (46%), and hypertension (36%)

CAUSES OF ISCHEMIC INFARCT

❖ **Cardioembolic Causes;**
- Atrial fibrillation, infective endocarditis
- Prosthetic valve endocarditis
- Rheumatic heart diasese

❖ **Hematological/ thrombophilic condtions**
- Inheriated thrombophilia; Factor V leiden mutation, protein C and S deficiency, Prothrombin gene mutation
- Acquired thrombophilia; Cancer, pregnancy, contraceptives, nephrotic syndrome,
- Sickle cell anemia
- Paroxysmal nocturnal hemoglobenuria

❖ **Inflamatory causes (connective tissue disease/vasculitis)**
- SLE, Primary Vasculitis
- Antiphospholipid antibody syndrome
- Important vasculitis condition;
  - ➢ Polyarteritis nodosa
  - ➢ Temporal arteritis and Cryoglobulinemia

❖ **Genetic causes**
- CADASIL (Cerebral autosomal dominant arteriopathy subcortical infarcts and leukoencephalopathy)
- MELAS (Mitochondrial encephalomyopathy, lactic acidosis and stroke like episodes)
- Fabry disease

❖ **Other important causes**
- Coronary artery disease (CAD)
- Moyamoya disease
- Fibromuscular disease

CAUSES OF HEMORRHAGIC STROKE

❖ Berry aneurysm
❖ Arteriovenous malformation
❖ Subacute abuse and Coagulopathy

STROKE IN YOUNG WORK-UP

Imaging;
- MRI Brain with DWI plus ADC
- CTA/CTV Brain
- 24hour holter monitoring
- 2-DEcho
- Trans-esophageal Echo
- Bubble study

Thrombophilia screen
- Antithrobin III Activity
- Factor V Leiden gene mutation
- Factor VIII Activity
- Homocysteine level
- Protein C and S Activity
- Prothrombin gene mutation
- Lupus anticoagulant
- Anti-Beta-2 glycoprotein 1 Ab
- Anticardiolipin antibody (IgG, IgM)
- D-Dimer, PTTK/INR, Serum lactate
- Lipoprotein (a) levels

Vasculitic/Autoimmune Screen
- ANA, Anti-ds DNA, ENA, C-ANCA, P-ANCA
- RA Factor, Anti-CCP
- ESR, CRP, ACE Levels
- HLA B51/5
- Anti-TPO antibody
- Anti- Thyroglobulin antibody
- Anit- TSH Receptor antibody
- Anti- Thyroid microsomal antibody
- Anti- TTG antibody
- Anti- Gliadin antibody

Infectious Screen
- Hepatitis B sAg
- Hepatitis C core antibody
- HIV serology
- VDRL/TPHA

MENINGITIS

Infection of the meninges, present with Combination of Fever, headache, meningism

Meningoencephalitis: Meninges, subarachnoid Space, and the brain Parenchyma are all frequently involved in the inflammatory reaction

- **Neck stiffness (Neck rigidity):** The examiner is unable to put patient's chin on the chest By passive flexion of neck (due to muscle spasm)
- **Kerning's Sign:** Straight leg raising is limited and induce pain
- **Brudzinski's sign:** Neck flexion induces bending of the legs

CSF study

Condition	Cell count cell type	Glucose	Protein	Gram stain
Normal	0-5 Lymphocytes	>60% of blood sugar	20-40mg%	Negative
Viral	**10-2000 Lymphocytes**	Normal	Normal (usually <150mg/dL)	Negative
Bacterial	1000-5000 polymorphs	**Low (usually <45mg/dL)**	**Elevated (usually >250mg/dL)**	**Positive**
Tuberculosis	50-5000 Lymphocytes	Low	Elevated	Negative
Fungal	50-500 Lymphocytes	Low	Elevated	Negative
Malignant	0-100 Lymphocytes	Low	Normal/ elevated	Negative

TREATMENT: ANTIBIOTICS

Indication	Antibiotics
Meningitis in children < 3 months: Gram-negative bacilli (E coli, Proteus etc.) Group B streptococci, Pseudomonas	Ampicillin 2 g IV every 4 hours plus Ceftriaxone 2 g IV BD
Meningitis in Children >3 months: H. influenza type B and adults <55: Pneumococcus 50%Neisseria meningitides 25% Enteric gram-negative bacilli mainly in diabetes, other chronic illness)	Benzyl penicillin 20 lakh unit IV 4th hourly plus ceftriaxone 2 g IV BD plus/minus Vancomycin 15 to 20 mg/kg IV TDS
Meningitis in Adults >55, Alcoholism or other chronic debilitating illnesses: Group B streptococcus (in individuals >50 years of age, particularly those with underlying diseases.)L. monocytogenes (pregnant women, individuals >60 years, and immunocompromised individuals of all ages.)	Vancomycin 15 to 20 mg/kg IV TDS + Ampicillin 2 g IV every 4 hours + cefepime 2 g IV every 8 hours **OR** Meropenem 2 g IV every 8 hours in patients with severe beta lactam allergies (e.g, anaphylaxis), Vancomycin + Moxifloxacin 400 mg IV once daily + for listeria coverage trimethoprim-sulfamethoxazole 5 mg/kg
Hospital-acquired meningitis, posttraumatic or post neurosurgery meningitis, neutropenic patients, or patients with impaired immunity(diabetes, on steroids)	Vancomycin + ceftazidime 2 g IV every 8 hours or cefepime 2 g IV every 8 hours. **OR** Meropenem. For patients with severe beta-lactam allergies (e.g. anaphylaxis) aztreonam 2 g IV QID or ciprofloxacin 400 mg IV TDS

Early Antibiotic and Steroids: Empirical therapy of community-acquired meningitis should include a combination of dexamethasone, Ampicillin/ Benzyl penicillin, a third-generation cephalosporin (e.g., ceftriaxone or cefotaxime) + Vancomycin, + acyclovir (if suspecting viral infection)

- Dexamethasone should only be continued if the CSF Gram stain and/or the CSF or blood cultures shows Strep pneumonia.
- Caution: The entry of Vancomycin into the CSF may be reduced by the decrease in inflammation with dexamethasone

Bacterial Meningitis

Chief Complaint:

- **Classical triad**: Fever, Headache, neck rigidity & Altered behavior (encephalitis)
- Vomiting , focal deficit
- Rashes (meningococcal disease)
  - Past Hx: DM, TB, HIV, HTN
  - Drug Hx: Chemotherapy, Steroids radiotherapy

O/E: Vitals, JACKLET, GCS, Neck rigidity+

- Kernig's sign; + , Brudzinski's Sign; +
- Plantar: B/L upward going

Investigation:

1. **Lumber puncture (CSF Study)**
   - **Pressure**: ↑or normal, **Appearance**: Cloudy
   - **Glucose**: low (usually < 45 mg/dl)
   - **WBC**: 1000-5000 polymorphs
   - **Protein**: Elevated (usually > 250 mg/dl)
   - **Gram stain**: Positive
2. **CBC with ESR Blood Culture**
3. **RBS, CRP, Serum creatinine, Urine R/E**
4. **CXR PA view** (if evidence of TB & pneumonias)
5. **CT scan of brain** (To exclude brain abscess)

Rx: **Date:** **Time:**

- Maintain Airway, breathing, circulation
- Pass catheter: If acute retention/incontinence
- Diet Pass NG if gag reflex is not intact

Feed Via NG in Sitting posture, maintain Posture for at least 30 mins

- **Inj. Ceftriaxone 2 gm (Rocephin, oxidil)** 1 vial IV stat and then BD (ATD) 10-14 days
- **Inj. Dexamethasone 4mg/ml (Decadron)** 2.5CC (10mg) IV stat & QID for 4 days
- **Inj. Omeprazole 40mg (Risek)** IV OD
- **Inf NS IL** IV @ 10drop/min or BD

If fever Present:

- **Inf. Paracetamol (Provas) 1gm** IV stat & SOS

If seizure (fits) present:

- **Inj. Diazepam 10mg (Valium)** IV stat & SOS

Prophylaxis for Close Contacts in case of meningococcal meningitis:

- Tab Ciprofloxacin 500mg (Ciproxin) 1 tab stat **OR**
- Tab Ofloxacin 400mg (Oflobid) 1 tab stat **OR**
- Tab Rifampicin 300mg 2+0+2 for 5 days

Tubercular Meningitis

Chief complaint: Gradual onset of restlessness and anorexia, Headache, Vomiting and seizures. Delirium, depression, low grade fever **Past Hx**: TB, DM, HTN, Contact with TB patient

O/E: Vitals, GCS, Neck rigidity, Brudzinski's Sign, Kernig's sign, Focal hemisphere Sign +/-

- 3rd nerve palsy: Cranial nerve abnormality typical, Papilledema

Investigation:

1 **Lumber puncture (CSF Study)**

- **Pressure**: Raised, **Appearance**: yellowish
- **WBC**: 50-50000 lymphocytes, **glucose:** low
- **Protein**: Elevated, **Gram stain**: Negative

2 **CXR PA view , CBC, ESR, RBS, RFTs, CRP**

3 **CT scan or MRI of brain**

Rx: **Date:** **Time:**

- **Maintain** Airway, breathing, circulation
- **Pass catheter:** If acute retention/incontinence
- **Diet:** Pass NG if gag reflex is not intact

Feed Via NG in Sitting posture, maintain Posture for at least 30 mins

- **Inj. Dexamethasone 4mg/ml (Decadron)** 2.5CC (10mg) IV stat & QID for 4 days

Start patient on Anti-tuberculous drug; 12-18 months

- **Tab Myrin p forte** 4 tab+0+0
- **Tab Pyridoxine hcl (Tab Vita 6) 50mg** 1+0+0

ENCEPHALITIS

Definition: Viral infection of CNS result in syndrome of aseptic meningitis or encephalitis.

Chief Complaint:

- Acute fever with severe headache
- Altered Sensorium.
- Aphasia, hemiplegia, visual field defect.
- Symptoms and Sign of raised ICP: Headache, vomiting, papilledema, Hypertension, bradycardia, convulsion focal neurological deficit.
- If temporal lobe involve: Olfactory, gustatory hallucination, anosmia, personality alteration and memory disturbance.
- Sign of meningeal irritation (neck rigidity) an usually absent with a pure encephalitis.

➢ Hx of Seizures
➢ Hx of Parotitis; Strongly suggest; mumps encephalitis
➢ Hydrophobic, aerophobia, pharyngeal Spasm Suggest; Rabies.
➢ Vesicles in a dermatomal pattern Suggest; Varicella zoster virus

O/E: Vitals (pulse, BP, SPO2%, Temp, RR)
CNS: GCS, Neck rigidity +/- , Papilledema
Brudzinski's Sign +/- , Kernig's sign +/-
Focal hemisphere Sign +/-

Investigation:

4 **CT SCAN or MRI of brain;** It can differentiate a focal or diffuse cencephalitis
5 **CSF PCR:** HSV PCR; Sensitivity 98%, specificity 94%
6 **Lumber puncture (CSF Study)**
- **Pressure**: Raised, **Appearance**: Clear
- **Glucose**: Normal (usually >50% of blood value, reduce value are seen With HSV, mumps or enteroviruses)
- **WBC**: ↑ (mainly lymphocytes:10-20 k)
- **Protein**: Elevated (usually < 150 mg/d)
- **Gram stain**: Negative

7 **CBC with ESR, RBS**
8 **Blood urea, creatinine:** uremic encephalopathy
9 **LFTS, Serum Ammonia:** hepatic encephalopathy
10 **ABG**: Hypoxic / metabolic encephalopathy
11 **EEG**: Focal temporal lobe Spikes on a background or low activity (in HSE).

Rx: **Date:** **Time:**

- **Maintain ABC** (airway, breathing, circulation)
- **Pass catheter:** If acute retention or incontinence
- **Diet:** Pass NG if gag reflex is not intact

Feed Via NG in Sitting posture, maintain Posture for at least 30 mins, Ensure hydration

- **Inj. Acyclovir (Aclova) 750 mg** (10mg/kg) IV TDS for 2-3weeks)
- **Inj. Dexamethasone 4mg/ml (Decadron)** 2 amp IV stat and 8hourly (or TDS) for 4 days
- **Inj. Omeprazole 40mg (Risek, Ruling)** 1 vial IV Stat and OD
- **Inf Paracetamol 1gm/100ml (Provas)** IV SOS (if fever present)

If fits/seizures present

- **Inj Levetiracetam (Lerace) 500mg IV BD**

If oral thrush or dryness of mouth

- **Miconazole oral gel (Macnaz)** Apply on oral cavity BD

If patient can't close eyes

- **Artificial tears (Tear Plus, Tearkool, Hyspa)** 2 drops each eye TDS

If Sign & Symptoms of raised ICP present then

- **Inf. Mannitol 20%** 300ml stat IV @ 30 drops/min) then 100 ml IV @30drops/min for 5 days **OR simply** Inf. Mannitol 20%. 500ml IV TDS

Home treatment (Rx on discharge)

➢ The recommended treatment for herpes Simplex encephalitis (HSE) remain intravenous acyclovir.
➢ if Acyclovir unavailable or unaffordable then can prescribe
Tab Valacyclovir 500mg (Valtrex)
1000mg TDS (or 2+2+2) for 7-14days

BELLS PALSY

Chief Complaint:

- Lower motor neuron (LMIN) facial weakness involving all muscles on that side with or without loss of taste, Hyperacusis and diminished salivation/ tear production
- Paralysis; progressive to maximal deficit over 3 to 72 hours.
- Pain, mild (50%): near mastoid process.
- Excess lacrimation (33%)
- Hyperacusis, dysgeusia
- Taste: No clinically significant changes.
- No Sensory loss (Through face may feel heavy)
- No severe pain in or around ear to suggest Herpes Zoster Oticus (Ramsay-Hunt syndrome)
- No other neurological abnormalities

O/E: Vitals: (Pulse, BP, Spo2%, Temp)

- Cranial nerve 7 examination & No Sensory loss
- Sensory examination of ant 2/3rd of tongue

Sweet: sugar solution, Sour: vinegar solution
Salty: Salt solution, Bitter: Quinine solution

- Reflex examination: Corneal reflex
- Secretory function: Schirmer test; it provides a quantitative evaluation of tear production

Investigation: No need : but we can do MRI brain

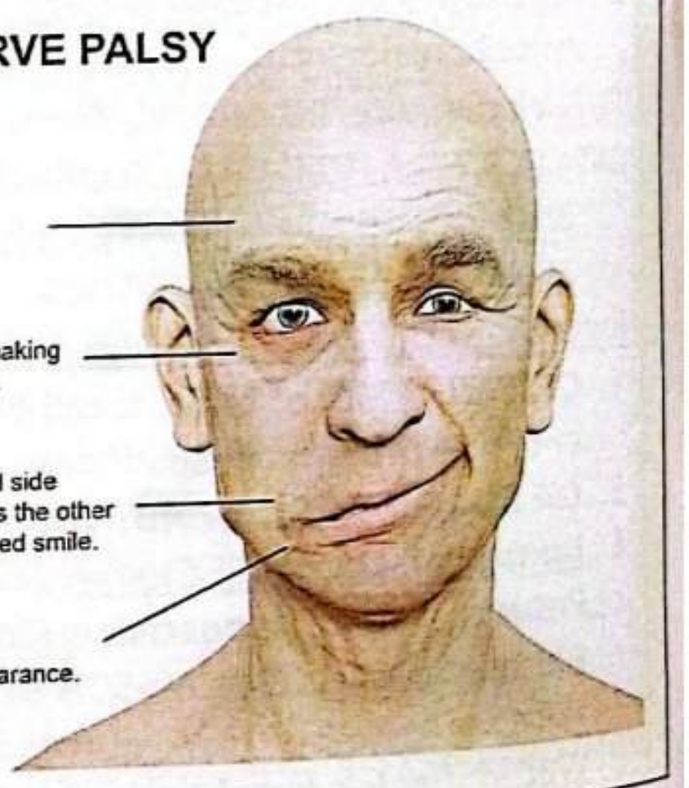
Physiotherapy: Chewing gum & balloon inflating

Rx: **Date:** **Time:**

- **Tab Prednisolone 5 mg (Deltacortil)**
  5+0+5 for 10 day (or 40-60mg/day)
- **Tab Acyclovir 400mg (Acylex)**
  2+2+2+2+2 - for 10 days. (if palsy is severe or complete, evidence of herpetic vesicles in external ear canal)
- **Cap. Esomeprazole 40mg (Nexum)**
  1+0+0 before breakfast for 14 days.
- Protection of eyes: Artificial eyes drops and eye should be covered
  Artifical eyes drops (Tear plus eye drops) 2 drops TDS

Prognosis:

- Resolution: 71% full recovery, only 12% classified as moderate & 4% poor
- Speed of recovery: recovery start within 3 weeks for most with full recovery at 6-12 months
- Complication: 9% can have spasm, contracture, tinnitus, hearing loss, crocodile tears (crying on salivation)


FACIAL NERVE PALSY
Inability to wrinkle brow:
The affected person may not be able to raise one eyebrow or wrinkle the forehead on one side
Drooping eyelid, inability to close eye:
The eyelid on one side may droop, making it difficult to close the eye completely.
Asymmetrical smile:
When the person smiles, the affected side of the face may not move as much as the other side, resulting in an uneven or lopsided smile.
Drooping corner of mouth:
The corner of the mouth on one side may droop, causing a lopsided appearance.

UMN VS LMN facial palsy

UMN palsy (upper motor neuron palsy)	LMN palsy (lower motor neuron palsy)
❖ Only lower face involved - upper part is relatively spared due to B/L innervation but a severe weakness can produce mild involvement of upper part also. ❖ No Bell's phenomena or weakness for eye closure. ❖ Both cranial nerve involvement & hemiplegia on the opposite side of lesion.	❖ Whole face is involved (both upper & lower) ❖ "Bell's Phenomenon present-inability to close the eye lids, on trying to close the eye lids. eye ball rolls upward (Bell's phenomenon) ❖ 7th Cranial nerve on the side of lesion and hemiplegia in the opposite side of lesion (if the lesion is near the PONS). No associated hemiplegia if the is outside the PONS

EPILEPSY

Seizures; Abnormal, unregulated electrical activity of cortical neurons that results in transient changes in behavior and/or EEG finding

Epilepsy; Epilepsy is a disease of brain defined by any of the following conditions

- ❖ At least two unprovoked (or reflex) seizures occurring >24hours apart
- ❖ One unprovoked seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years
- ❖ Diagnosis of an epilepsy syndrome

Remember in epilepsy the seizures has to be unprovoked and most seizures do not mean epilepsy

Symtomatic (Provoked) seizures; Seizures due to an identifiable condition (e.g brain tumor) that causes an increased predisposition to seizures. Provoked siezures are seizures that may occur as a result of

- Hypoglycemia, electrolyte imbalance, alcohol withdrawl and drug abuse

Trigger factors for seizures;

- Sleep deprivation, missed doses of anti-epileptic drugs in treated patients
- Alochol withdrawl, recreational drug misuse, physicial and mental exhasution
- Flickering lights, including TV and computer screens
- Intercurrent infection and metabolic disturbance

INVESTIGATION;

a) **Biochemical**
   1. CBC with ESR, CRP, RBS, LFTs
   2. Serum urea and serum electrolyte
   3. Serum Calcium, serum magnesium

b) **EEG** (or reflex)
   - Normal EEG doesn't exculed epilepsy
   - Abnormal EEG support primary idiopathic process
   - Poor guide to seizure control
   - Exception; Absence seizures (3 HZ Spikes and wave changes)
   - Sensitive to Rx, and monitoring by EEG

c) **MRI brain with Epileptic protocaol**

MRI is indicated in following conditons

- Partial seizures on history
- Focal neurological deficit
- Onset >16 years of age
- Seizures is difficult to control with antiepileptics
- Definitive EEG features

IF Seizures still not control with treatment given then better to refer to Neurologist

Rx; **Date;** **time;**

- ❖ **Most neurologist start antiepileptics following the a second epileptic seizures**
- ❖ **NICE guidelines suggest starting antiepileptics after the first seizures if any of the following are present**
  - Brain imaging show a structural abnormality
  - The EEG shows unequivocal epileptic activity
  - The patient or their family or carer consider the risk of having a features of seizures unacceptable
  - The patient has neurological deficit

For GTCS (GENERALIZED TONIC CLNIC SEIZURES)

First line TX; Sodium Valproate (Epival), lamotigine if Sodium valproate is not sutiable

Adjunctive therapy; Levetiracetam (Lerace), Lamotrigine, Topiramate (Hitop), Clobazam, Lamotrigine

- ❖ **Start with one 1st line drug ; Satrt at low dose gradually increase dose until effective control is achieved or side effects develop**
  - **Tab Sodium Valproate 500mg (Epival)**
    1 tab OD then inccarese dose to BD
    For children; Syp Epival 1tsf OD then to BD
- ❖ **If seizures continues then**
  - Check for any precipitating factors (Alcohol, exhaustion sleep disturbance), Check compliance
  - Review neuroimaging , Reconsider diagnosis
- ❖ **Introduce another 1st line agent when a resonable dose is achieved, then the first drug can be withdrawal slowly**

We mostly add; Levetiracetam 500mg (Lerace) OD then BD

ABSENCE SEIZURES (Petit mal)

Absence seizures are a form of generalized epilepsy that is mostly seen in children, the typical age of onset 3-10 years old and girls are affected twice as commonly as boys

FEATURES;

- Absence seizures presents with a blank stare, 3 Hz brain waves and don not show postictal confusion
- Absence last a few seconds and are associated with a quick recovery
- Seziures may be provoked by hyperventialtions or stress
- The child is usually unaware of the seizure, may occur many times a day
- EEG; Bilateral, symmetrical 3Hz spike and wave pattern

Rx **Date;** **Time;**

Tretaed with drug which target T-type calcium currents which are Ethosuximide and Valproic acid
Ethosuximide is better and safe than Valproic acid
But Ethosuximide is not available so we will gor for

- **Tab Sodium Valproate 500mg (Epival)**

1 tab OD then can increase dose to BD
For children; Syp Epival 1tsf OD then to BD

PSEUDOSEIZURE

Pseudoseizures are commonly misdiagnosed as true seizures and treated inappropriately with anti-epileptic drugs

Factor favouring pseudosezires includes;

- Pelvic thrusting
- More common in females
- Crying after seizure
- Don't occur when alone
- Prolonged nature of the attacks (15-30minutes)
- Voilent shaking
- Resistance to passive eye opening
- Trigger by anger, panic
- Colour; normal, breathing; continuous

Diagnosis; Video telemetry is useful for diffenretiating

Rx **Date;** **Time;**

Treatment; Simple observation is the appropriate management

Factor favoring true epileptic seizures;

- Tongue biting
- Raised serum prolactin
- Duration; minutes
- Breathing; Apnoeic
- Color; cyanosed
- No resistnace to forced eye opening

Mycolic seizures; Sodium valproate 1st line Adjunct therapy; Levetiracetam, topiramate
Tonic or atonic seizures; Sodium valproate Adjunct therapy; Lamotrigine
Focal eizures; Carbamazipine or Lamotrigine 1st line. If both of them are unstuaible then offer; Levetriacetam, oxcarbazapine, sodium valprovate, Adjunct therapy; Topiramate, Gabapentine, Clobazam

- **Tab Sodium Valproate 500mg (Epival)** 1 tab OD then can increase dose to BD
  For children; Syp Epival 1tsf OD/BD
- **Tab Levetiracetam 500mg (Lerace) 1 tab OD/BD**
- **Tab Carbamazipine 200mg (Tegral)**
- **Tab Topirmate 25mg (Hitop) OD/BD**
- **Tab Lamotrigine 25mg, 50mg, 100mg (Lamictal)**
- **Cap Gabapentine 300mg (Gabix, Neogab)**

STATUS EPILEPHTICUS

Chief Complaint:

- ❖ More than 5-10 min of continuous seizure activity.

OR

- ❖ Seizures activity not resolving Spontaneously OR
- ❖ Continuous seizure with no complete recovery of Consciousness - in between.

Drug Hx: Anti-epileptic drug
Past Hx: Epilepsy, Diabetes mellitus
Menstrual Hx: It is important to exclude Eclampsia

O/E:

- vitals (Pulse, BP. Spo2% , Temp)
- CNS, CVS, Chest examination, JACKLET

Investigation:

1) **RBS**
2) **ABG** (oxygen saturation)
3) Serum Calcium, phosphorous
4) Serum sodium, magnesium .LFTS, RFTS,
5) CBC, CSF Study
6) Drug screen (Anti-epileptic drug level in blood)
7) Urine R/E , ECG
8) CT/MRI brain, EEG

Note:

Left Lateral position of patient after seizure control to Prevent aspiration.

Rx on discharge

If seizure Control & patient became Stable.

Tab Na valproate 500mg (Epival)

1+1+ dose (800-2000 mg/day)

Treat the underlying cause.

Rx: **Date:** **Time:**

- **Maintain ABC** (airway, breathing, circulation)
- O2 inhalation Stat and then SOS
- Diet: NPO Change posture hourly.
- Clear Secretion, mouth, artificial denture.
- Pass and secure 2 IV lines.

Step 1: **Inj. Lorazepam** (0.1 to 0.15mg/kg) IM or Slowly IV Stat & repeat once only if no response within 10 mins or IV infusion @ 2mg/min

If Lorazepam not available then alternatives are

- **Inj. Diazepam (Valium)** (0.1-0.3 mg/kg) 10-20mg IV stat and repeat once if no response after 10-15mins **OR**
- **Inj. Midazolam (Dormicum)** 10mg IM or IV repeat if needed

If Seizures doesn't subside after 30 mins then

Step2:

- Inj. Phenytoin 250mg/ 5ml (Epigran) dilute in 100ml NS IV @ < 50mg/kg/min dose 15- 20mg/kg
  - ✓ contra in: Bradycardia or heart block
  - ✓ Can give I/M if IV access can't be obtained.

IF seizures still continue after 10-25 mins then: give another dose of Phenytoin(Epigran)

If Seizure Still Continue then; then

STEP 3:

- **Inj. Phenobarbitone (Phenobarb)** 20mg/kg IV @ 50-75mg/min

If seizures still continue after 60-70 minutes then Repeat Phenobarbitone dose with: 5-10mg/kg **or Inj. Phenobarbitone (Phenobarb)** IV infusion of 1 to 4mg/kg/hr to maintain the patient in seizure free stat.

If Seizure Still continue:

STEP 4:

Refer to ICU for intubation, ventilation and GA

Management of status epileptics

- Maintain ABC, clear mouth, secretion, artificial dentures
- Administer oxygen if needed.
- Monitor ELC, and blood pressure
- IV Thiamine (looms) and dextrose (50mL of 50% dextrose solution) Consider
- Control of Convulsion (seizures)
- Find cause and prevent further convulsion.
- if no seizures- left lateral position to prevent Aspiration

Treatment of Status epilepticus in adults

Inj. Lorazepam (0.1 to 0.15mg/kg) IV
repeat once if needed after 15mins **OR**
Inj. Diazepam (valium) 10 mg IV

⇩

if seizures doesn't stop after 30 minutes then

⇩

Inj. Phenytoin 250mg/ 5ml (Epigran) dilute in 100ml NS IV @ 50mg/kg/min dose 15- 20mg/kg
IF seizures still continue after 10-25 mins then: give another dose of Phenytoin(Epigran) **or**

- **Inj. sodium valproate (Epival)** 500mg (20-40mg/kg in 100ml NS IV @ 3-6mg/kg/min
  OR Inj. Levetiracetam (Lerace) 40-60mg /kg IV
- **If no immediate access to ICU then:**
- **Inj. Phenobarbital (Phenobarb)** 20mg/kg IV @ 50-75mg/min **or**
- **IV lacosamide** (200 to 400mg IV bolus) maintenance dose 200mg

Admitted to ICU:

- For intubation, ventilation and general anesthesia using
- Midazolam (0.2 mg/kg load followed by 0.7-10 mg/kg/min infusion)
- Propofol (2 mg/kg load followed by 30-250mcg/kg/min in fusion)
- IV phenobarbital
- Others: Ketamine IV: 1 to 2 mg/kg over 30 to 60 seconds.

Note: Midazolam can be given at dose of 10mg IM, nasally or buccally for "Patient with a body weight > 40kg and 5mg for weight of 13 to 40kg.
Fosphophenytoin can be given as IM injection if IV line access can't be obtained.

MIGRAINE HEADACHE

Chief Complaint: **Duration:** 4 – 72hour

1) **Severe headache** which is dull at onset and later **Throbbing** (increase with each pulse)
2) Nausea, ± vomiting, and photophobia, phonophobia
3) Unilateral in 2/3 and B/L in 1/3 of patients
4) **Prodrome**: Depression, irritability, food craving, behavior changes
5) **Aura (20% of cases)**

- Zigzag line over visual field (visual aura)
- Sensory aura: Paresthesia (Numbness) Spreading from one part to another part of body

6) **Post drome:** weakness or feel exhausted
7) Scalp tenderness (very common)
8) Syncope, seizures (rare)
9) **Cutaneous Allodynia**; it is the perception of pain produced by innocuous stimulation of normal skin, like brushing hair, touching the scalp, shaving, or wearing contact lenses may trigger allodynic Symptoms of pain

Family Hx: Around 50% patient have family History

O/E: Nothing significant, scalp tenderness

Criteria of migraine

A. Migraine without Aura

1) Headache Lasting 4hour to 72hours
2) Nausea, vomiting & photophobia, phonophobia
3) Two of the following

I) Unilateral pain. **II)** Pulsating pain
III) Moderate or severe intensity pain
IV) Aggravated by simple physical activity

B. Migraine with aural: Atleast 3 of the following

1) Reversible focal brainstem/cortical dysfunction
2) Aura develops > 4mins or 2 aura in successions
3) Each aura < 60mins
4) Headache < 60min following aura

Indication for prophylaxis

- 2 or more than 2 headache per month with disability lasting > 3 or more days/month
- Failure of, contraindicated for, or adverse event from acute treatment and Neurological complication

Rx: Date: Time:

Life style modification & avoid triggers:

- Good sleep avoid sleep deprivation or oversleeping in morning
- Eating regular meals (hypoglycemia potent trigger)
- Avoidance of triggers e.g cheese, alcohol, OCP, stress, hunger, lack of sleep, sunlight, traveling.

Mild migraine:

NSAIDS (Aspirin, Paracetamol, Naproxen)

- **Tab Naproxen 500mg (Neoprox, Synflex)**
  1+0+1
- **Cap Esomeprazole 20mg (Ezomol)**
  1+0+1 before meal (till taking NSAIDS)

Tab Metoclopramide 10mg (Maxolon)
1+0+1 – before meal

Moderate to Severe or If attack are frequent (> 2 attack Per months):

NSAIDS + Metoclopramide + Triptans

- **Tab Sumatriptant + Naproxen Na 85/500mg (Sumoxen)** 1+0+1 – continue
- **Cap Esomeprazole 20mg (Nexum, Ezomol)**
  1+0+1 – (till taking NSAIDS)

Other triptans are:

Tab Almotriptan 6.25mg
Tab Rizatriptan 5mg
Tab Zolmitriptan 5mg nasal spray

Injection in ER

- **Inj. Metoclopramide 10mg (Metomide)** IV stat
- **Inj. Ketorolac Tromethamine 30mg (TEKAC, Toradol)** 1 vial dilute in 4ml NS IV stat Slowly
- **We can also give inj mgso4**
  Inj MgSO4 1 to 2 gm in 100ml NS IV OVER 30mins

Note; when the pain is abut to start can give
Tab Zomig 2.5mg 1 tab P/O stat

New TX:

- ✓ **Trans cranial magnetic stimulation**
- ✓ **Vagus nerve stimulation**

NEW drugs for TX migraine

- **CGRP Antagonist: Ubrogepant, olcegpant, Rimegepant (Oral drugs)**
- **$5HT_{1F}$ Agonist: Lasmiditan etc.**
- **Monoclonal Antibody: Erenumab , Eptinezumab Fremanezumab, Galcanezumab**

Special Condition

1) **Contraception:** Migraine without aura: low dose OCP can use Migraine with aura Combined OCP increase risk of Ischemic Strike so use progesterone only pill (POP) or non-Hormonal Contraceptive.
2) **Peri-menstrual migraine;** if not control with Standard Treatment
   Tab Sumatriptant 25mg TDS start: 2-3 days prior to anticipated onset of menstrual migraine and continue for 5 days after **OR**
   Tab Zolmitriptan 2.5mg 1 to +1 on the days migraine is expected
3) **Pregnancy:** Tab Paracetamol 500mg (Panadol) 2 tab Stat
   Note: NSAID and triptans can be given on risk benefit ratio

❖ Prophylactic Treatment of migraine

- Propranolol (DOC) should be used in preference to topiramate In women of Child bearing age
- if above treatment fail NICE recommend" sessions of acupuncture over 5-8 weeks
- NICE recommend that Riboflavin in young may be effective

PROPHYLAXIS: (A or B or C)

A. **Tab propranolol 40mg (Inderal, Cardinal)** 1+0+1 (80-240mg/day)
   Tab Naproxen 500mg (Neoprox, Synflex) BD or when the pain started to break the cycle (take it with PPI: Cap Ezomol 20mg)
   Cap Flunarizine 5mg (lunar, Sibelium) 5-10mg at night

B. **Tab propranolol 40mg (Inderal, Cardinal)** 1+0+1 (80 – 240mg/day)
   Tab Naproxen 500mg (Neoprox, Synflex) BD or when the pain started to break the cycle (take it with PPI: Cap Ezomol 20mg)
   - **Tab Topiramate, 25mg (Topiro, Hitop)** 0+0+1 at night can also Advice BD (50 – 200mg/day) best for obese

C: Remaining:

- **Amitriptyline (Tab Amitryp, Tab Amylin)** 25mg (10-50mg) at night **OR**
- **Na^+ valproate (Tab Epival)** 500mg BD can increase upto 200mg/day) **OR**
- **Verapamil** 80 – 480mg/day **OR** ACEI, ARBS (e.g lisinopril, candesartan)
- **OR** Gabapentin 900 – 3600mg **OR** Oral Magnesium 400mg/day , Vit B2 (Riboflavin)

CONDITION	MEDCINE FOR PROPHYLAXIS
Hypertensive non-smoker, age ≤ 60 years	Drug of choice blocker: Propranolol, Atenolol, Nadolol
Hypertensive smoker age > 60 years	Verapamil or Flunarizine
In Patient with depression / mood disorder	Amitriptyline or Venlafaxine or desvenlafexine (Depistiq-XR 50mg)
In Patient with Epilepsy	Valproate (Epival) 500mg BD or topiramate 25mg (Hitop) at night
In Patient with insomnia	Amitriptyline (Tab Amylin) 25mg at night or Gabica 50mg OD HS
In Obese patient	Topiramate 25mg (Hitop) at night
In patient with Raynaud phenomenon	Verapamil or Flunarizine 5mg (cap lunar, Sibelium) 5-10mg at night
In patient with syncope	Venlafaxine (Velax 37.5mg and Velax XR 75mg) OD at morning

TENSION HEADACHE

Chief complaint:

- Most common type of primary headache
- Headache like, tight, or vise like or band round head or pressure at vertex
- Pain is Bilateral and Squeezing
- Mild to moderate intensity
- Duration: >30minutes (usually 4-6 hours) constant
- Constant and generalized, but often radiates forwards from the occipital region
- No focal neurological symptoms

Criteria for diagnosis: Atleast 2 of the following

1) Pressing/tightening (non-pulsatile) quality
2) Mild or moderate intensity-may inhibit but doesn't prohibit activity
3) Bilateral location
4) No aggravation by walking, stairs, or similar routine physical activity
5) Both of these two:
   No nausea or vomiting (anorexia may occur)
   No photophobia and phonophobia or one but not both present

Rx; Date: Time:

For acute treatment:

NSAIDS (like Naproxen etc.)

- **Tab Naproxen 500mg (Synflex, Neoprox)**
  1+0+1 or SOS **OR**
  Tab Paracetamol 500mg (Panadol)
  2 tab stat and SOS
- **Cap Esomeprazole 20mg (Nexum, Ezomol)**
  1+0+1 before meal (till taking NSAIDS)

Prophylaxis/chronic headache:

First line: Amitriptyline and Nortriptyline

- **Tab Amitriptyline 10mg (Amyline)**
  0+0+1 for 3 months **OR**
- **Tab Nortriptyline (Sensival) 25mg OD**

2nd line: Mirtazapine, Venlafaxine

ADVICE:

- Explanation and reassurance.
- Physiotherapy/Behavioral therapy Biofeedback, Relaxation training

(muscle relaxation and Stress management)

Avoid triggers: Stress, fatigue, hunger, sleep deprivation, noise or glare

MYASTHENIA GRAVIS (MG) Important points:

ICE Pack Test

In the ice pack test, a bag (or surgical glove) is filled with ice and placed on the closed lid for two minutes. Then ptosis is assessed. Improvement in ptosis is a positive test result.

- The ice pack test is useful for ptosis (due to myasthenia). An ice pack is applied to the affected upper eyelid for 5 minutes.
- A positive test is the improvement of Ptosis by > 2mm or more.
- This transient improvement in ptosis is due to the cold decreasing the acetyl cholinesterase break down of acetylcholine at the neuromuscular junction.

Tensilon test: IV Edrophonium bromide; 2 mg given as test dose (if no adverse effect 8mg after half a minutes (30 seconds). the dose is administered in two parts because some patient develop Side effect (S/E) such as nausea, diarrhea, fasciculation, syncope, bradycardia.

- Atrophine 0.6mg should be ready for IV administration if above S/E become troublesome
- With edrophonium power increase in 20 seconds and persist for 2 to 3 minutes.

Drugs that may exácerbate MG

- Antibiotic: Aminoglycosides, Quinolones, macrolides
- Beta blocker, Quinine derivatives, Magnesium, Penicillanine
- Muscle relaxant (pancuronium, Vecuronium), Local anesthetic- Xylocaine in large amount.

MYASTHENIA GRAVIS (MG)

Chief Complaint:

- Progressive muscle weakness: Weakness in ocular, bulbar, Limb, & respiratory muscle.
- Symptoms increased during the end of day or after vigorous exercise
- Ptosis, diplopia, weakness of Chewing, Swallowing, Speaking, movement of Limbs.
- > 50% patients present with isolated Ocular symptoms of ptosis or/and diplopia
- 15% Patient present with bulbar symptoms. (dysarthria, dysphagia, fatigable cheewing)
- < 5% present with proximal limb weakness
- Key features is muscles fratigability
- Difficulty Lifting up the upper limb above shoulders

O/E: Vitals (pulse, BP, SPO2%, Temp, RR)

CNS examination: **no sensory symptoms or signs**

- Deep tendon reflexes & Pupil : are normal
- On counting aloud, patient Voice gradually weakens.
- sustained upgaze lead to ptosis

Investigation:

1) **Ice pack test & Tensilon test**
2) **Anti Ach receptor antibody (AchR Ab)** : 80-90% sensitive) **(best initial test)**
   If AchR Ab negative then do **Anti MUSK antibodies**
3) **Anti-MUSK antibodies (muscle specific kinase)** (36% of patient with myasthenia but in 80% of those with thymoma)
4) **Electromyography (EMG): Most accurate test**
   Single fiber electromyography (SFEMG) best for myasthenia diagnosis, Repetitive Stimulation, may show characteristic decremental response
5) CT/MRI: to exclude thymoma (CT with contrast best)

Rx: **Date:** **Time:**

- **Tab Pyridostigmine (Amygra)**
  (30 to 120mg QID or 6th hourly) 60mg

Monitor for Cholinergic side effect if cholinergic side effect occur add glycopyrrolate 1mg with each dose of Pyridostigmine dose:

- Glycopyrrolate 1 mg per oral
- Hyoscyamine sulphate 0.125mg per oral
- Most patient with muscle-specific tyrosine kinase (MUSk) positive disease have poor response to anticholinesterase agents.

To decrease immunological attack: Advice

1) Thymus surgery; thymectomy indicated in all patient with generalized MG who are between the age of puberty and at least 55 years.
2) **Plasma exchange;** It remove antibodies from blood indicated in Myasthenia crisis or for pre-operative preparation
3) Alternate to plasma exchange in severe case. IV immunoglobulin (IVIG)
4) **Steroids:** it is indicated during exacerbation of Myasthenic symptoms
   - **Tab prednisolone 5mg (Deltacortil);** start 20mg daily then increase by 5mg every 3-5 days to a usual Target dose of 60mg/day over 4-8 weeks then taper
5) **Pregnancy;** Prednisone is the immunosuppressant of choice in pregnancy
6) **Immunosuppressive;**
   - Azathioprine 2.5 mg/kg daily.
   - Mycophenolate mofetil 1-1.5g BD
   - Tacrolimus 0.1 mg/kg per day.

Better to refer to neurologist for proper tx

Myasthenic crises

- **Cause**: Due to Overmedication
- **C/F:** Tachycardia, respiratory distress
- Pupil Mydriasis, High BP
- Normal secretions
- **TX:** with IV Edrophonium bromide
  In respiratory failure; Mechanical Ventilation

Cholinergic crisis

- **Cause:** Due to under medication.
- **C/F:** Bradycardia, abdominal cramps,
- Pupil – Miosis, BP - low (Hypotension), increase secretion, salivation
- **TX:** Inj. Atropine 0.4 to 2mg IV **or**
- Inj. Glycopyrrolate 0.2 to 1 mg IV

GUILLAIN BARRIE SYNDROME (GBS)

Definition: It is the most common type of acute demyelinating polyneuropathy that primarily affects motor nerves. Usually preceded by a viral or mycoplasma infection of upper respiratory or Gastrointestinal tract. Common infection includes Campylobacter jejuni, Cytomegalo virus, hepatitis.

Chief Complaint

- Ascending type of Paralysis which is progressive and symmetrical usually start in lower limb but In 10% may start in upper limb or facial muscle)
- weakness of proximal muscles > Distal muscles
- Facial naive weakens in >50% patients
- Oropharyngeal Weakness in 50% patients
- Paresthesia (no Sensory disturbance)
- Pain in Back and extremities due to nerve root inflammation
- No bowel and bladder involvement
- Severe Respiratory muscle weakness
- Sphincter control & mentation are typically spared
- Autonomic features (e.g, arrhythmias, tachycardia)

Past Hx: History of diarrhea.

On Examination

- Vitals, GCS, CNS examination.
- Sensory: intact
- "Motor: All reflexes are absent

Absent deep tendon reflexes in 90%/ cases)
Dysautonomia occur in 70% of patient

Investigation

1) CSF Study (albumino cytological dissociation)
   - ✓ Raised protein after 1 week
   - ✓ Cell normal
   - ✓ A CSF pleocytosis can be seen in GBS Patients who have HIV infections
2) Electrodiagnostic features (nerve conduction Study) Decreased motor nerve conduction velocity
3) Serum electrolyte to exclude hypokalemia.

Diagnostic criteria

1) Progressive weakness of 2 or more limb due to neuropathy. **2)** Areflexia
3) Progression of disease less than 4 weeks.

Exclusion of other causes like

• Vasculitis , Porphyria, Infections (Diphtheria, Botulism) & Toxin (OPS)

Rx Date: Time:

- **Maintain ABC**: (Airway, breathing, Circulation) Respirators weaken to be treated with mechanical Ventilation
- **Bed rest:** Change posture 2 hourly, physiotherapy
- **Inj. Human immunoglobulin (IVIG)** 400mg/kg IV - for 5 days (total dose of 2g/kg of body weight given over 5 days) (at 0.4g/kg/day)

Plasmapheresis(Plex):

(Technique design for the removal of large molecular weight substance from plasma)

- ➢ Patient with mild GBS on admission should receive 2 Plex
- ➢ Patient with moderate to Severe forms Should benefits from further 2 exchanges
- ➢ 1-1.5 plasma volume exchange per procedure

Corticosteroid (oral, IV)

Not recommended

For Autonomic dysfunction like HTN, tachycardia;

- Inj. Labetalol 50mg/10ml 20mg(4ml) IV Over 2 minute, if needed can repeat

Refer to ICU: If respiratory distress.

For summary of Treatment Remember "**AIDP**"

A= Airway
I= Immunoglobulin (IVIG)
D= Drug for autonomic dysfunction.
P= Plasmapheresis (PLEX)

Supportive in diagnosis

- ✓ Relatively Symmetric weakness
- ✓ No sensory involvement
- ✓ Facial or other cranial nerve involvement
- ✓ Absence of fever
- ✓ CSF (Albumino, cytological dissociation)
- ✓ Electrophysiological evidence of demyelination.

PARKINSON DISEASE (PD)

Definition; It is a neruodegenrative disease caused by disruption of dopaminergic nerurotransmitter in the basal ganglia. Pathology; Depletion of the pigmented dopaminergic neurons in the substantia nigra.

Cilincal Features;

- **Cardinal featues (Dopaminergic pathway (Before 4 but now 2) remember as TRAP**
1) **T; Tremors, Resting trmors,** Pill rolling tremor
2) **R; Rigidity**
3) **A; Akinesia/Bradykinesia – Disability**
4) **P; Posture; Flexed and stooped posture (not a cardinal feature but also common)**

Gait; Festinating, shuffled gait

- **Early non-motor features (Non-dopaminergic pathway)**
  - Dementia, Anosmia (earliest symtoms)
  - Depression, delusion, hallucination
  - Pain, Sleep disorder (RBD)
  - Autonomic dysfunction; Orthostatic hypotension, constipation, drooling of saliva, sexual dysfunction, urinary incontinence
- EYE signs;
  - Decrease blink rate
  - Hypometric saccades (decrease velocity of fast movements)
  - Broken pursuit (jerky nature during slow movement)
  - Glabellar tap (Myerson s sign)

O/E; Vitlas (Pulse, BP, Temp) look for eye signs

Investigation; No need as

- Diagnosis is made on clinical grounds

1) **Excludes Wilson diasese if onset <50years;** LFTS, Serum Ceruloplasmin and S.Copper
2) **VDRL to rule out Syphillus**
3) **MRI brain;** Not a diagnostic investigation but can rule out Parkinson plus syndrome (Hot Cross sign, Humming sign), hydrocephalus, tumor, or lacunar infarct, atypical parkinsonism
5) **SPECT Scan** (Da Tsan) ; in PD Show reduce dopamine activity in the basal ganglia. Usefull in differentiating essential tremors from PD

RX; TIME; DATE;

- For control of major features;
  - **Tab Ropinirole 0.25mg (Reol)**
    0 + 0 + 1 continue can titrate upto 3mg
  - **START Sinemet if**
    Early diability (history of frequent fall)
    Can t tolerate dopamine agonist (i.e, Ropinirole)
    Dopamine agonist not effective alone
    Tretament
    Tab Carbidopa/levodopa 25/250 (Sinemet)
    ¼ + ¼ + ¼ + ¼ continue then up titrate
- In Early disease for bradykinsia or for controlling dyskinesias produce by dopameniergic treatment or with sinemet will also add
  - **Tab Amantadine 100mg (Pkmerz, Amanta)**
    1 + 0 + 1 (maximum dose 400mg)
- In patient with response fluctuation to levodopa or as initial monotherapy in young patient
  - **Tab Selegiline 5mg (Jumex)**
    1 tab morning and 1 tab at noon **OR**
  - **Tab Rasagiline 1mg** 1mg OD as monotherapy
    0.5mg if to be used with levodopa
- Young patient with troublesome trmors
  Prescribe anti-cholenergic; as it reduce tremors and rigidity
  - **Tab Benzhexol** 1-4 mg TDS **OR**
  - **Tab Orphenadyrine** 50-100mg TDS
- For constipation
  - **Syp Laxoberon** 2tsf tds or SOS
- For Erectie dysfunction
  - **Tab Sildenafil 25mg (Viagra) 1 tab**
- For Insomnia
  - **Tab Melatonin 5mg (Somno)** OD at night
- For dementia or memory weakness
  - **Cap vit E 400mg OD**
  - **Tab Memantine (Zexa)** 10mg BD for 1 month

T; Tremors, Resting trmors • Pill rolling tremor; ▪ Adduction and abduction of thumb ▪ Flexion and extension of fingers ▪ Supination and pronation of forearm • Tremors of arms and feet • Tremors usually starts unilaterally in the hand, and then spreads contralaterally several years after the onset of symptoms • It may appear later in the lips, tongue, and jaw but spares the head and neck • In early PD tremors are most often intermittent • Tremors disappear during sleep	**R; Rigidity** • ↑ muscle tone not velicty dependent • Cog wheel type in upper limbs (due to rigidity plus tremors) • Lead pipe type in lower limbs • Rigidity can lead to stiffness, pain, decreased arm swing with walking, and the typical stooped posture.
A; Akinesia/Bradykinesia – Disability • Slowness/poverty of movement (Swallowing infrequent blinking, masked face) • Fine motor task; hand writing (micrographic), teeth brushing, buttons (finger tapping)- asymmetrical • Hypophnia, Rolling over bed; out of chairs • Decreased step size	**P; Posture; Flexed and stooped posture** (not a cardinal feature but also very common) • **Gait;** Festinating (rapid steps, tenency to run) • shuffled gait • Asymmetrical arm swing • Slowing to start walking, shortened stride • Impaired balance on turning, freezing gait

DIAGNOSIS;

❖ **Bradykinesia and atleast one of the following;**

- **Muscle rigidity**
- **Rest tremors** (4—6 Hz)
- **Postural instability unrelated to primary visual, cerebellar, vesitublar or proprioceptive dysfunction**

❖ **Supportive criteria for PD ;** Three or more required for diagnosis of definite PD

I) Unilateral onset **II)** Excellent response to levodopa **III)** Rest tremors present **IV)** Progressive disorder **V)** Severe levodopa induce chorea **VI)** Levodopa response for over 5 years **VII)** Persistance asymmetry affecting the side of onset most **VIII)** Clinical course of 10 over years

Parkinson plus syndrome;

Clinical Features of parkinsonism plus features of other neurological dysfunction like autonomic disturbance cerebellar involvement, motor weakness and opthalmoplegia

Types; Shy-Drager syndrome, Progressive supranuclear palsy, Olivo pomto cerebellar Atrophy

Psychiatry

NEUROLEPTIC MALIGNANT SYNDROME (NMS)

Definition: NMS is a neurologic emergency associated with the use of neuroleptic agent

Chief Complaint:

- More common in young male patient
- **Onset:** First 10 days of tretament or after increasing dose of antipsychotic
- **Altered mental status** (initial symptoms) (Agitated, delirium, confusion, catatonic sign, mutism, encephalopathy with stupor & coma)
- **Hyperthermia:** Temp >38°C are typical (87%), but even higher temp >40°C are common (40%)
- **Rigidity:** "Lead-Pipe rigidity" superimposed tremor may lead to cogwheel rigity, dystonia, opisthotonos, trismus, chorea & other dyskinesia's
- **Autonomic dysfunction**: Tachycardia, high BP, tachypnea, Dysthymia may occur, Diaphoresis

On examination:

- Vitals (Pulse, BP, Temp, HR) JACKLET, GCS
- Fever, tachycardia, HTN, Sweating, Tremors, Mydriasis

Investigation:

1) **Serum CK:** Elevated (CK typically >1000 IU/L and can be as high as 100,000 IU/L)
2) **Serum electrolyte**: Hypocalcaemia, hypomagnesaemia, hypo & hypernatremia, hyperkalemia,& metabolic acidosis
3) **RFTS, Serum Creatinine**: Rhabdomyolysis can lead to myoglobinuric acute renal failure.

Other test:

- **MRI, CT** BRAIN are typically normal, but diffuse cerebral edema can be seen
- **EEG:** To rule out nonconvulsive status epilepticus. In NMS patients, generalized slow wave activity is seen

Dugs causing NMS:

- **Neuroleptic agents:** Aripiprazole, chlorpromazine, clozapine, Fluphenazine, haloperidol, olanzapine, perphenazine, Quetiapine, Risperidone, Thioridazine
- **Antiemetic agents**: Domperidone, droperidol, Metoclopramide, Prochlorperazine, Promethazine
- **Anti-Parkinson medication withdrawal**

DDS; Serotonin syndrome, Tetanus, Malignancy

Rx: Date: Time:

- Bed rest, Stop any neuroleptic or precipitating agent

For fever: Cold sponging, cooling blanket
Water gastric lavage & ice packs in the axilla

- **Inj. Paracetamol** 1gm/100ml **(Provas)**
  1 bottle IV stat & TDS
- **Inf NS 1L** (if Renal failure)
  IV @30 drops/min
- **Inj. Lorazepam (Ativan, Tenzil)**
  1 to 2 mg IM or IV TDS **OR**
  Inj. Diazepam 5mg/ml (Valium)
  2amp IV stat & TDS

If CK is very elevated:
Vigrous volume IV fluid,
Urine alkalization (Syp Fedralka, Citralka)

- **Clonidine (for high BP)**
- **Tab bromocriptine**
  2.5 mg through NG tube QID (Max 40mg/day)
  continued for 10 days after NMS is Controlled & then slowly taped
- **Inj. Dantrolen**
  0.25-2mg/kg IV every 6 to 12 hourly
- To prevent deep venous thrombosis: LMW
- **ECT:** Effective in resistance cases

Restarting Neuroleptics:

- ✓ Wait at least two weeks before resuming therapy, longer if any clinical residua exist
- ✓ Use lower rather than higher potency agents
- ✓ Start with low doses & titrate upward slowly
- ✓ Avoid concomitant lithium, dehydration
- ✓ Carefully monitor for symptoms of NMS

	Serotonin Syndrome (SS)	NMS
Reflexes	Hyperreflexia, clonus	Hyporeflexia
Pupil	Mydriasis	Normal /Normal
Bowel sound	Hyperactive	

DEPRESSION

Chief Complaint: (Symptoms ≥ 2 weeks)

A. (Core Symptoms):

1) Depressed mode (sadness of mood)
2) Loss of interest & enjoyment, loss of pleasure in activaties, which one enjoyed earlier
3) Reduce energy & decrease activity

B. (Associated Symptoms):

1. Decrease concentration
2. Reduce self-esteem & confidence
3. Ideas of insufficiency, inadequacy & worthlessens, unexplained idea of guilt
4. Pessimistic thoughts
5. Idea of self-harm (suicidal ideas)
6. Disturbed Sleep 7. Diminish appetite

- Mid depression: At least 2 of A + 2 of B
- Moderate depression: At least 2 of A + 3 of B
- Severe depression: All 3 of A + At least 4 of B

Rx: **Date:** **Time:**

- **Tab Escitalopram 10mg (Citanew)**
  ½ +0+0 – 6 days Then
  1+0+0 – continue **OR**
  Tab Sertraline 50mg (Freedep)
  1+0+0 (Can be increased up to 200mg/day After 5-6 weeks in increments of 50mg) **OR**
  Tab Amitriptyline 25mg (Amyline)
  1+1+1 (increase by 25mg every 3rd day till 150mg/day

If sleep is disturbed: add

- **Tab Alprazolam 0.5mg (Alp, Xanax)**
  0+0+1 AT night 14 days **OR**
- **Tab Lorazepam 0.5mg (Ativan)**
  0+0+1 AT night 14 days

Advice: Counselling, Reassurance, Psychotherapy, Cognitive therapy

GENERALIZED ANXIETY DISORDER

Chief Complaint:

- Excessive, anxiety/ worry about various daily events/ activates ≥ 6 months
- Difficulty controlling the worry
- Associated ≥ 3 symptoms: Restlessness, fatigue, impaired concentration, irritability, muscle tension, insomnia
- Persistence anxiety present all time
- Symptoms of sympathetic over activity: Palpitation, sweating, dry mouth

Investigations:

1) **ECG, CBC, RBS, TSH, free T3, free T4**

In pregnancy: (safe anti-depressant)

Tab Sertraline 50mg (Freedep)
Tab Fluoxetine 20mg (Prozac, Depricap)

In Lactating mother: Sertraline 50-100mg OD

Rx: **Date:** **Time:**

Pharmacological (SSRIS + Benzodiazepine)

- **Tab Escitalopram 10mg (Citanew)**
  ½ +0+0 – 6 days then
  1+0+0 – continue **OR**
  Tab Sertraline 50mg (Freedep)
  1+0+0 (50-100mg/day) **OR**
  Tab Paroxetine 20mg (Seroxate CR)
  ½ +0+0 – 6 days then
  1+0+0 – continue
- **Tab Alprazolam 0.5mg (Alp)**
  0+0+1 for 2 weeks then ½ tab OD **OR**
- **Tab Bromazepam 3mg (Lexotanil)**
  1.5-3mg 1+0+1 **OR**

Non-Pharmacological TX: Reassurance, Psychotherapy Encouragement, yoga or breathing exercises,

- **Antidepressant in HTN, DM, IHD, older age:** Sertraline (Tab Freedep) 50-100mg OD
- **In post-traumatic stress/disorder:** Sertraline (Tab Freedep) 50-100mg OD

ANXIETY(Social Anxiety disorder)

Chief Complaints:

- Palpitation, sweating, chest Pain, Dizziness, Shortness of breath, loss of control
- For Atleast six months

Rx: **Date:** **Time:**

- **Tab Escitalopram 10mg (Citanew)**
  ½ +0+0 – 6 days then 1+0+0 – continue **OR**
  Tab Sertraline 50mg (Freedep) 1+0+0 (50-100mg/day)
- **Tab Propranolol (Inderal) 40mg** 1+0+1

INSOMNIA DISORDER

Refer to number of symptoms that interfere with duration and low quality of sleep despite adequate opportunity for sleep

Chief Complaint:

- Difficulty initiating/ maintain sleep or early morning awakening with inability to return to sleep
- Occurs at least 3 days a week for at least 3 months
- Causes clinically significant distress or impairment in functioning
- Occurs despite adequate opportunity to sleep
- Doesn't occur exclusively during the course of another sleep wake disorder
- Acute insomnia: < 3 months due to stress or change in sleep schedule, resolve spontaneously
- Chronic insomnia; > 3 months to years

Rx: **Date:** **Time:**

- **Sleep hygiene measures**
- **Cognitive behavioral therapy CBT**
- **Tab Alprazolam 0.5mg (Alp)**
  0+0+1 14 days **OR**
  Tab Clonazepam 5 mg (Rivotril)
  0+0+1 for 7-14 days **OR**
  Tab Lorazepam 1mg (Ativan)
  0+0+1 for 14 days
- **Tab Amitriptyline 25mg (Amyline)**
  1+0+1

Treat the underlying cause if any

OBSTRUCTIVE SLEEP APNEA HYPOPNEA

Definition: Chronic breathing-related disorder characterized by repetitive collapse of the upper airway during sleep and evidence of by polysomnography of multiple episode of apnea, or hypopnea per hour of sleep

Chief Complaint:

- Excessive daytime sleepiness
- Apneic episodes characterized by cessation of breathing or hypopnea episode of reduced air flow (>15 per hour)
- Sleep fragmentation, snoring, morning headache
- Frequent awakening due to gasping or chocking

Central Sleep Apnea:

Evidence of 5 or more central apneas per hour of sleep. And It can be idiopathic or due to opioid use

Rx: **Date:** **Time:**

- Positive airway pressure:
  CPAP & Bi-PAP
- **Weight loss, exercise**
- **Surgery** (if severe obese)

TX: Central sleep apnea

- Treat underlying cause
- CPAP & Bi PAP
- 02 inhalations (supplemental 02)

SCHITZOPHRENIA

Definition: Schizophrenia is psychiatric disorder characterized by a constellation of abnormalities in thinking, emotion & behavior. Negative, positive & behavior symptoms > 1 month duration

Chief Complaint:

- **Positive Symptoms**: Hallucinations, Delusions
- **Negative Symptoms**: Social withdrawal, decrease self-care, flat effect
- **Cognitive Symptoms:** Impairment in attention, executive functions & working memory
- **Behavior Symptom:** (abusive, aggressive, violent), Laughing, smiling, or crying without any obvious reason, Talking irrelevantly, fearfulness
- Muttering or talking to self or imaginary figures
- Remaining quiet, disorganized behavior

Rx: **Date:** **Time:**

- **Tab. Olanzapine 5mg (Olanzia)** 0+0+1 continue **OR**
- **Tab. Quetiapine 150 mg (Qusel)**
  0+0+1 – continue **OR**
- **Tab Aripiprazole 10mg (Arizole)** 0+0+1 **OR**
- **Tab. Quetiapine 150 mg (Qusel)**
  0+0+1 – continue

For agitation add:

- **Tab Lorazepam (Ativan) 1-2mg**
  1+0+1 or 1+1+1 for 1-2 weeks

Behavioral therapy

PANIC DISORDER

Definition: Characterized by Spontaneous, recurrent panic attacks, these attacks occur suddenly "out of the blue" the frequency of attacks ranges from multiple times per day to a few monthly.

Chief Complaint:

- Discrete episodes of sudden onset of palpitations, chest pain, choking sensation, dizziness, feeling of unreality; often accompanied by fear of dying, losing, control
- Onset & remission of attacks : Spontaneous
- Individual attacks last for minutes
- Not associated with situational trigger & occurs out of the blue

Diagnosis & DSM-5 Criteria:

- ❖ Recurrent, unexpected point attacks without an identifiable trigger
- ❖ 1 or more of panic attacks followed by ≥ 1 month of continuous worry about experiencing subsequent attacks or their consequences, and/or a maladaptive change in behaviors (e.g. Avoidance of possible triggers)
- ❖ Not caused by the directly effects of a substance, another mental disorder or another mental condition
- ❖ Panic disorder is diagnosed when panic attacks are accompanied by a chronic fear of the recurrence of an attack or a maladaptive change in behavior to try to avoid potential triggers of the panic attack

Rx: **Date:** **Time:**

Psychological (CBT) is the Treatment of choice (Cognitive behavioral therapy) along with Pharmacological (SSRIS) + Benzodiazepine

SSRI:

- **Tab. Escitalopram 10mg (Citanew)**
  ½ +0+0 – 6 days then 1 +0+0 – Continue **OR**
- **Tab. Fluoxetine 10mg (Flux, Prozac)**
  1+0+0 – (Increased up to 20mg/day after 1 week)

Alternate

- **Tab. Venlafaxine 37.5mg**
  1+0+0 (can be ↑ up to 225mg/day)
- **Tab. Imipramine 25mg**
  1+0+1 (↑ slowly by 25mg every 2-3 days to max dose of 150-250mg/day)

Benzodiazepine: (Use until the other medication reach full efficacy)

- ❖ **Tab Lorazepam (Ativan)** 1-2mg BD **OR**
- ❖ **Tab Alprazolam 0.5mg (Alp)**
  0+0+1 2 weeks then half tab 2 weeks

Rx Duration:

- ✓ 8-12 months (minimum)
- ✓ Taper slowly over a period of 6-8 weeks

OBSESSIVE COMPULSIVE DISORDER (OCD)

Definition: OCD is characterized by obsessions and/or compulsions that are time consuming, distressing, & impairing

Chief Complaint: & Diagnosis

- Experiencing obsession and/or compulsions that are time consuming (e.g. > 1 hour/daily) or cause significant distress or dysfunction
- **Obsessions:** Thoughts images or impulses that are recurrent unwanted & usually anxiety provoking e.g. though of contamination, giving rise to repeated hand washing.
- **Compulsions:** Repetitive behaviors or mental acts the patient feet's driven to perform in response to an obsession or a rule aimed at stress reduction or disaster prevention.
- Not caused by the direct effect, of "substance, another mental illness, or another medical condition"

Rx: **Date:** **Time**

CBT + Medical therapy (SSRI first line Medication)

- **Tab. Fluoxetine 20mg (Flux, Prozac)** 1+0+0 **OR**
- **Tab. Sertraline 50mg (Freedep)**
  1+0+0 – (50-100mg/day)

Alternate (as 2nd line): TCA, Clomipramine

Last resort: In Treatment-resistance, severely obliterating case:

- Psychosurgery (Cingulotomy) **OR**
- Electroconvulsive therapy (ECT)

Advice:

Patient are encouraged to expose then selves to the feared though or situation without performing the anxiety- relieving compulsions

BILPOLAR AFFECTIVE DISORDER

Definition: Bipolar I disorder involves episodes of mania & of major depression; however, episodes of major depression are not required for the diagnosis

Chief Complaint:

1) Episodes of mania & depression or mania alone with intervening periods of normalcy
2) Episode of mania are characterized by:
   Symptoms for ≥ 1 week

- Elevated, explosive or irritable mood
- Inflated self-esteem or grandiosity
- Over talkive, over activity
- Interfering behavior
- Decrease need for sleep (Insomnia)
- Excessive investment in pleasurable activities that have a potential of harmful consequences

On Examination

CBC, Serum bilirubin, LFTS (SGPT, SGT) PT/INR

Diagnosis:

❖ The only requirement for diagnosis is the occurrence of a mania episode (5% of patient experience only manic episodes) b/w manic episodes, there may be interspersed euthymic, major depressive episodes or hypomanic episodes, but none of these are required for diagnosis

❖ Bipolar II disorder: Alternatively called recurrent major depressive episode with hypomania

❖ DX: Hx of 1 or more major depressive episode & at least one hypomania episode

- Lithium: Regular blood level monitoring
- Carbamazepine & Na valproate: LFTS, CBC – once in 6 months

Rx: **Date:** **Time**

Pharmacotherapy + Psychotherapy + ECT

DURING ATTACK OF MANIA:

1. **Mode stabilizer:**
   Tab. Na valproate 500mg (Epival)
   0+0+1 – continue (500-1500mg/day in 2-3 divide closes)
2. **Anti-Psychotic:**
   Tab. Risperidone 2mg (Benzisox, Peridal)
   1+0+1 – continue **OR**
   Tab. Haloperidol 5mg (Dosik)
   1+0+1 – continue (max 15mg/day)

IF SLEEP DISTURBED (insomnia)

Tab. Lorazepam 1mg (Ativan)
0+0+1 – continue 15 days (can increase up to 4mg/day)

IF Patient develops extra pyramidal symptoms:

Tab. Trihexyphenidyle 2mg (Lamictal)
1+0+1 – continue (taper after 3 months)

During depression:

1. Mode stabilizers:
   Tab. Lamotrigine 25mg (Lamictal)
   1+1+1 – continue (50-400mg in divide doses)
2. Anti-Psychotic
   0+0+1 – continue (Max 600mg/day)
3. In more severe cases. Add
   Tab. Fluoxetine 20mg (Flux)
   1+0+0 – continue (increased up to 60mg/day) In increments of 20mg after 5-6 weeks

SOMATOFROM DISOREDER

Chief Complaint:

- One or more somatic symptoms (predominantly pain) that are distressing or result in significant disruption
- Repeated medical consultations for somatic, symptoms which are not explained by medical condition and cannot be diagnosed as a part of anxiety or depressive disorder

Rx: **Date:** **Time:**

- **Tab Amitriptyline 25mg (Amyline)**
  0+0+1 at night for 2-3 months

Advice:

❖ Reassurance and explanation
❖ Positive explanation for symptoms including but not emphasizing on psychological factors
❖ Encourage return to normal life

ACUTE PSYCHOSIS

Definition: General term used to describe a distorted perception of reality. Poor reality testing may be accompanied by delusion, illusion, hallucination &/or disorganized thinking/ behavior

Chief Complaint:

- Psychosis can be a symptoms of schizophrenia, mania, depression, delirium & dementia and it can be substance or medication induced
- Delusion, illusion, hallucination, disorganized thinking & behavior for more than 1 day but less than 30 days

On Examination:

- Vitals (Pulse, BP, SPO2%, Temp, RR)

Delusion:

Fixed, false beliefs That remains despite evidence to contrary and cannot be accounted by cultural background of the individual

Illusion: Misinterpretation of an exciting sensory stimulus

Hallucination:

Sensory perception without an actual external stimulus (Auditory, visual, olfactory & tactile hallucination)

Refer to psychiatrist: For further diagnosis and treatment accordingly

Rx: **Date:** **Time:**

Acute Management

- **Inj. Haloperidol 5mg (Serenace)**
  1 amp IM stat
- **Inj. Procyclidine 5mg (KEMPRO)**
  2 amp IM stat

Injection can be repeated after 8 hours

- **Inj. Diazepam 10mg/2ml (Valium)**
  IV stat (If Patient is aggressive)

Rx on discharge:

- **Tab Haloperidol 5mg (Dosik)**
  1+0+1 -- continue
- **Tab Procyclidine 5mg (Kemadrin)** 1+0+1 – continue

If sleep disturbed, then

- **Tab Lorazepam 1mg (Ativan)**
  0+0+1 – (1-2mg) **OR**
- **Tab Clonazepam 5mg (Rivotril)** 0+0+1

If develops extrapyramidal symptoms (tremors, parkinsonian face, silorrhea) then

- **Stop Anti-Psychotic**
- **Continue procyclidine & add**
- **Tab Trihexyphenidyl 2mg**
  1+0+0 (Tapper at after 3 months)

SMOKING CESSATION

Advice to quit smoking

Acess the patient if can quit smoking within 30 day

RX;

Mainstay of tretament is person well to quit somking with pschotherpay/motvitional interview with psychiatrist

Tab Bupropion 150mg (start 1-2 week before quite date) 1+0+0 3 days then 1+0+1 for 7-12 weeks

Also can Advice Nicotine patches

Tab Varenicline 0.5mg (start taking the tablet 1 week before intened quit date) 1+0+0 3 days then 1+0+1 4days then 2+0+2 for 11 weeks

Nicotine withdrawal symptoms;

- Urges to smoke (70%), poor concentration (60%), increase appetitie (70%)
- Irratibility/ aggression (50%), depression(60%), night time awakening (25%)
- Restlessness (60%), light headedness (usually first few days after quiting 10%)

Rheumatology

RHEUMATOID ARTHRITIS (RA)

Definition: It is an autoimmune disease, more common in female. Common age: 30 to 50 years associated with HLA-DR4 (50%), Sjogren syndrome, felty syndrome, SLE, Systemic sclerosis

Chief Complaint:

- B/L, Symmetrical arthritis with pain, Swelling and Stiffness in small joint of hand, feet and wrist.
- Morning joint stiffness > 1 hour (improved: with use)

No DIP involvement
wrist: Most Common Site

- **Involved joints:** wrist, MCP, PIP of hand and Knee, elbow, ankle, shoulder
- Anorexia, fatigue, weight loss
- **Seronegative limited synovitis-** less Symmetrical, wrist > fingers, better long-term prognosis
- **Cervical spine:** due to Rheumatoid Synovitis
- Also extra-articular involvement

O/E: Vitals (Pulse, BP, Spo2%, Temp, RR) JACKLET

- ❖ **Hand: i)** Swelling, tender and pain in joints. **ii)** Rheumatoid nodules: S/C nodules on extensor surface **iii)** Deformities (if not treated properly)
- ❖ Boutonniere of button hole deformity.
- ❖ Swan neck deformity, Z-deformity of thumb
- ❖ Cock-up toe deformity

Investigation:

1) **CBC:** normocytic normochromic anemia.
2) **ESR, CRP:** Both are raised
3) **Rheumatoid factor (RF):** Present in 70% of cases. Has got a prognostic value and it is negative in 30% of Patients early in illness
4) **Anti-Citrullinated cyclic peptide antibodies (Anti-CCP - ELISA) ;** Early marker of RA Specificity: 90%, Sensitivity: 60%.
5) RBS, RFT, LFT, ECG, urine R/E
6) X-rays of the affected joints: Periarticular osteopenia, decalcification, joint sub laxation, joint space narrowing

Biological Treatment: Etanercept, Rituximab, infliximab, adalimumab JANUS Kinase (JAK) inhibitors

Rx: **Date:** **Time:**

- **Inj. Methylprednisolone Acetate** (Depo-Medrol) 40mg/1ml, 80mg/2ml 80+40 mg IM Stat once only. (Prescribe by some Physician in Pak)
- **Tab prednisolone 5mg** (deltacortil) 3+0+3 - 1 week Then 2+0+2 - 1 week Then 1+0+1 - 1 week Then 1+0+0 - 1 week
- **Cap Omeprazole 40mg (Omezol, Zolbi)** 1+0+0 (before meal)
- **Tab Methotrexate 2.5 mg (Cytotrexate)** 3 tablet every Friday (once weekly)
- **Tab Folic Acid 5mg** 1 tab daily except on Friday
- **Tab CeleCoxib 100mg (Celbex)** 1+0+1 (For pain) **OR**
- **Tab Paracetamol + Tramadol (Tonoflex-p)** 1+0+0 or 1+0+1
- **If 1 or 2 joints are chief source of difficulty: Inj. Triamcinolone 40mg/ml (KENCORT-A)** 10-40 mg intra-articular: depend on Size of joint & Not more than four times a year

Follow up; within 6 weeks with labs:
ESR, CRP, CBC, RFT, LFT, urine R/E

with disease progression follow & can add:

- Increase dose of methotrexate up to 25 mg once weekly
- **Tab Hydroxychloroquine 200mg (Tab HCQ)** 1+0+0 or 1+0+1-Continue (with periodic eye checkup) **OR**
- **Tab Leflonamide 20mg (Cara, Lefora)** 1+0+0 continue **Monitor:** CBC, LFT **OR**
- **Tab Sulfasalazine 500mg (Salazine)** 1+0+0 – increase each weekly by 500mg Up to 2-3 g /day (Monitor CBC)

❖ **Advice: Physiotherapy**

In pregnancy:

- ✓ Stop Methotrexate (MTX) 3 months & Leflonamide 24 months before trying to conceive.
- ✓ Analgesic: Paracetamol (orally) only, & CeleCoxib Up to 20 weeks of gestation
- ✓ Can use glucocorticoids
- ✓ DMARDS Safe in pregnancy; Sulfasalazine, Hydroxychloroquine and Azathioprine
- ✓ Breast feeding: Avoid Methotrexate, Leflonamide, cyclophosphamide

Arthritis presentation: **70% of cases are slowly progressive:** B/L Peripheral polyarthritis

- **15% are rapid onset arthritis**
- **Palindromic Rheumatism (5%);** short lived (24 to 72 hours) episodes of acute Monoarthritis which resolves completely.
- **Monoarthritis: (10%)** wrist, knee, shoulder, or ankle (inflammation and swelling)
- **Seronegative RA:** both RF & anti-CCP antibodies negative with C/F of rheumatoid arthritis

Classification Criteria for RA:

JOINT DISTRIBUTION (0-5)	Score
1 large joint	0
2-10 large joints	1
1-3 small joints (large joints not counted)	2
4-10 small joints (large joints not counted)	3
>10 joints (at least one small joint)	5
SEROLOGY (0-3)	
Negative RF AND negative ACCP	0
Low positive RF OR low positive ACCP	2
High positive RF OR high positive ACCP	3
SYMPTOM DURATION (0-1)	
<6 weeks	0
≥6 weeks	1
ACUTE PHASE REACTANTS	
Normal CRP AND normal ESR	0
Abnormal CRP OR abnormal ESR	1

Poor prognostic features:

- ✓ RA +
- ✓ Anti-CCP +
- ✓ HLA DR4
- ✓ Early articular erosion
- ✓ Insidious onset
- ✓ extra articular feature nodules
- ✓ Female patient.

Score ≥6 = definite RA

Disease Modifying Anti Rh[illegible] Drugs (DMARDS):

- **Methotrexate (Cytotrexate) 7.5 mg/week** (up to 30 mg, some patients with severe disease may require 25 mg as initial dose) with Folic Acid 5mg Every day except on day of taking methotrexate
  [Monitor blood counts (Bone marrow suppression), Liver function (Liver fibrosis), X-Ray chest (Pneumonia, TB)]
- **Hydroxychloroquine (HCQ)200 to 400 mg** orally per day (with periodic eye checkup)
- **Sulfasalazine (Salazine)** start 500 mg/day, increase to 2-3 g/d (Monitor blood count)
- **Leflonamide:** start 100 mg/d for 3 days then 10 to 20 mg/day (Monitor blood counts, LFT)
- **Selection of DMARDS**
  - Mild disease: Start Hydroxychloroquine or Sulfasalazine (SSZ)
  - Patients with mild activity and poor prognostic signs: Sulfasalazine
  - In patients resistant to 3-6 months of therapy with HCQ or SSZ for initially mildly active disease, add MTX.
  - "Triple therapy" with HCQ, SSZ, and MTX is an alternative to MTX+TNFI

Anti-TNF-Q agents (Etanercept, infliximab, Adalimumab)

- **Etanercept:** Administered at a dosage of 25 mg SC twice weekly or 50 mg once per week.
- **Rituximab:** IV infusion: 1000 mg on days 1 and 15 in combination with MTX if necessary, may be repeated no sooner than every 16 weeks
- **Infliximab:** IV 3 mg/kg at 0, 2, and 6 weeks then every 8 weeks thereafter; doses have ranged from 3-10 mg/kg IV infusion repeated at 4-to 8-week intervals (The total dose of the reconstituted product must be further diluted to 250 mL with 0.9% Sodium Chloride Injection. The infusion concentration should range between 0.4 mg/ml and 4 mg/ml. The infusion should begin within 3 hours of preparation and give it over 2 hours.)
- **Adalimumab:** 40 mg subcutaneously every other week.

SEPTIC ARTHRITIS

Definition: Invasion of a joint by an infectious agent resulting in joint Inflammations

Causes: - common organisms Staphylococcus aures (including MRSA), streptococcal pneumonia, gram negative bacilli, rarely Brucellosis others; Mycobacterial species, fungal species, Spirochete

Chief Complaint:

- Acute onset of inflammatory monoarticular arthritis: mostly Knee joint other joint hip
- Pain on movement & at rest limited range/ loss of movement
- Symptoms typically include redness, heat and pain in a single joint associated with decrease ability to move joint
- Onset is usually rapid
- Fever, weakness, headache

Past Hx: Diabetes mellitus, rheumatoid arthritis, immunosuppressive disease

Drug Hx: immunosuppressive drug

O/E: Vitals, JACKLET

- Local examination; Swollen, hot, red joint with pain at rest and movement

Investigation:

1) **CBC with ESR, CRP, Serum uric acid**
2) **Synovial fluid aspiration:**
   Culture (90% positivity), Gram satin (50% positivity)
3) **Joint X rays :** joint effusion, osteomyelitis
4) **Blood culture** (positive in 50% of cases)

MRSA; Methicillin resistance stap Aures

Rx: **Date:** **Time:**

- **Admit the patient**, Bed rest
- Inj. Flucloxacillin 500mg
  4 vial IV Stat and QDS - 2 week,
- **Serial needle aspiration** to dryness 2-3 time daily
- **Inj. Omeprazole 40 mg (Risek, Ruling)**
  1 Vial IV stat & OD
- **Inj ketorolac 30mg/ml (Toradol)**
  1 amp IM stat & TDS

If the initial gram stain of the Synovial fluid show gram+ Cocci then:

- **Inj. Vancomycin 500mg or 1gm (Vancocin, Vanbact)**
  1gm IV BD [30mg/kg/24 hours]

If the initial gram stain of synovial fluid show gram - bacilli then:

- **Inj. Ceftriaxone 2gm (Oxidil, Rocephin)**
  2gm IV once daily **OR**
- **Inj. Cefotaxime 1gm (Claforan, Cefotax)**
  2gm IV every 8 hours (or 2gm IV TDS) **OR**
- **Inj. Ceftazidime 1gm (Fortum)**
  1 to 2 gm IV every 8 hours (or TDS)

OTHER:

Physiotherapy, Passive movement

Antibiotic duration:

✓Uncomplicated septic arthritis; 2 weeks
✓Septic arthritis +osteomyelitis; 3 weeks
✓MRASA ; 3-4 weeks

Synovial fluid examination:

TYPE	WBC per mm³	% Neutrophils	Viscosity	Appearance
Normal	<200	0	High	Transparent
Osteoarthritis	<5,000	<25	High	Clear yellow
Trauma	<10,000	<50	Variable	Bloody
Inflammatory	2,000-50,000	50-80	Low	Cloudy yellow
Septic arthritis	>50,000	>75	Low	Cloudy yellow
Gonorrhea	10,000	60	Low	Cloudy yellow
Tuberculosis	20,000	70	Low	Cloudy yellow

Inflammatory = Gout, RA, Rheumatic fever

GOUT

Definition: Gout is a disorder caused by hyperuricemia (serum urate > 6.8mg/dL) that results in the precipitation of monosodium urate crystals in and round joints. Causing Acute or chronic arthritis

Chief Complaint:

- Asymptomatic hyperuricemia:
  No joint pain, only uric acid level raised.

Acute: First Metatarsophalangeal joint arthritis:

- About 90% patients are men, age > 30years
- Mainly in lower limb as monoarticular arthritis
- First MTP joint arthritis is called as "podagra"
- Other joints: ankle, knee, mid fort, small joints of hand wrist elbow can also be effected.

Acute problems: Pain occur suddenly in the night with redness, swelling, local ↑ in temperature.
Acute arthritis Last for: 3 to 10 days. Then may subside without any symptoms until the next episode (inter-critical period).

Chronic tophaceous gout: Mono sodium urate crystals from smooth white deposit (Tophi) in skin & around joints. They are seen on ear, finger, & Achilles tendon. Large deposit may ulcerate.

- Fever, malaise & even delirium

Kidney problems:

- Nephrolithiasis, Urate nephropathy
- Uric acid nephropathy; (can cause acute Renal failure)

O/E: Vitals, JACKLET,

- **Local examination:** swelling, erythema & shiny skin, extreme tenderness, tophi

Investigation:

1) **Serum uric acid:** >7mg/dl (it can be normal during on acute attack, 12 – 43%)
2) **X-ray of joints** (Usually normal in acute gout)
3) **Lipid profile, urine R/E, CBC, RFTs, Electrolyte**
4) **Joint fluid study**: Monosodium urate crystals (needle like negative birefringent crystal)

INDICATION OF URATE LOWERNG DRUGS:

Recurrent attack of acute gout, evidence of bone or joint damage, renal impairment, nephrolithiasis

Diet: Avoid purine rich diet (red meat, seafood), Take plenty of water, Avoid drug – diuretics, Pyrazinamide
Avoid alcohol, Bakery food, Beverage drinks

Rx: **Date:** **Time:**

Asymptomatic hyperuricemia:
should not be treated; uric acid lowering drugs need not be instituted until arthritis, renal calculi, or tophi become apparent

Acute attack:

➢ **NSAID: (naproxen or indomethacin)**

- **Tab Naproxen 500mg (Neoprox)** 1+0+1 **OR**
- **Tab indomethacin 25-50mg (indocid)**
  1+1+1 for 5 to 10 days
- **Cap Esomeprazole 20mg (Nexum, zolbi)**
  1+0+1 before meal (till taking NSAID)

➢ **Colchicine;** (with monitoring CBC, LFTs)

- **Tab Colchicine 0.5 mg (Crycol)**
  1+0+1-- 3 months till symptoms normal
  OR if acute attack then 1mg (2 tab) loading dose, 1 tab hourly till the patient develops vomiting or diarrhea (not > 3mg/day). **OR** simply give 2 tablet stat, 1 tablet an hour later for the first day then 1 tab BD

➢ **Steroids:** In patient having severe pain or NSAID contraindicated then give

- **Tab Prednisolone 5mg (deltacortil)**
  4+0+4 (or 1 mg/kg) 5-10 days OR
- **Inj methylprednisolone (depo-medrol)**
  80mg+ 40mg IM stat (once only)

If 1 joint involve (monoarticular):

- **Inj. Triamcinolone 40mg (kenacort)**
  Intra-articular [not > 4 injection per year]

If chronic gout/or if indication present:

- **Tab Febuxostat 40,80mg (Gouric,Urigo)**
  40mg to 80mg once daily
  slowly reduce &Continue on 40mg OD
  It has less side effect & no dose adjustment is needed in renal & hepatic failure. **OR**
- **Tab Allopurinol 100mg (Zyloric)**
  1+0+0 – 1week, slowly ↑ to 300mg/day
  ½+0+0 – older Patient or renal impairment

NOTE: Allopurinal should not be used in acute attack

SYSTEMIC LUPUS ERYTHEMATOSIS (SLE)

Definition: It is the most common multisystem Connective tissue disease, autoimmune disease
Male: Female = 1:9, Peak age 20-30 years, 90% patients are women of child bearing age

Chief Complaint:

- **Systemic;** Fatigue, malaise, fever
- **Musculoskeletal;** Arthralgia, Joint swelling myositis, non-erosive polyarthritis, morning stiffness of joints
- **Cutaneous;** Malar rash, discoid rash, photosensitivity , oral ulcers,
- **Hematological:** Anemia, leukopenia, Thrombocytopenia
- **Neurological;** psychosis, memory Loss, Seizures TIA, polyneuropathy,
- **Cardiopulmonary:** pleuritis / Pericarditis with effusion MI, Liebman - Sachs Endocarditis
- **GIT;** Nausea, abdominal pain, lupus hepatitis (SGPT, SGOT), diarrhea
- **Vascular;** Raynaud phenomena, Thrombosis
- **Ocular;** Sicca Syndrome, Scleritis,
- **Renal;** proteinuria, HTN, Nephrotic Syndrome, CRF(chronic renal failure)
- Libman-sacks endocardtitis
- **Pregnancy;** Recurrent miscarriage

O/E: Vitals, CNS, CVS, chest examination

- Anemia, Lymphadenopathy, malar rash

Investigation:

1) **CBC:** Anemia, lymphopenia, Neutropenia
2) **ESR;** Raised. **CRP**: Normal
3) **ANA: Sensitive but not specific**
4) **Anti-dsDNA: highly specific**
5) **Serum complement (C3, 4); ↓**
6) **ECG, RBS, Serum creatinine, CXR** (PA view)

NOTE: Renal, cardiac Hematological, CNS involvement all need corticosteroid therapy

Rx: **Date:** **Time:**

- Educate the patient about the nature of disease
- To avoid sun, UV rays, and Employ sunblock.
- If smoker tell to stop Smoking

For minor skin lesion: topical steroids & sunblocks

- **Fluicinolone cream (Derma smoth)**
  Apply on affected area 2 times a day

For Arthritis: (Or Mild to moderate SLE)
NSAIDs + Hydroxychloroquine or Methotrexate

- **Tab Naproxen 500mg (Neoprox, Synflex)**
  1+1+1 (if having pain) **OR**
  Tab CeleCoxib 100mg (Celbex) 1+0+1
- **Tab Hydroxychloroquine 200mg (HCQ)**
  1+0+1 Continue (with annual eye checkup)
- **Cap Esomeprazole 40mg (Nexum, Ezomol)**
  1+0+0 before breakfast for 3 months

For Acute exacerbation (Acute pneumonia autoimmune mediated)

- **Inj Methylprednisolone 1000mg (Depo-Medrol)**
  IV for 3 days in 200ml NS IV @ 40 drop/min then start **Tab prednisolone 5mg (Deltacortil)** 4+0+0 Taper over 3 months then maintain on 10mg/day

If renal or CVS or CNS involvement we give
Inj. Cyclophosphamide, along with Steroids IV

- **Inj Methylprednisolone 1000mg (Depo-Medrol)**
  IV in 200ml NS IV @ 40 drop/min for 3 days
  Then on day 4 give cyclophosphamide.
- **Inj. Cyclophosphamide 1000mg** 1 Vial IV stat
  for proper protocol of cyclophosphamide see next page

For life threatening SLE:

- **Inj. Methylprednisolone (Depo-Medrol)** 1g/day IV for 3 days.

For Patient resistance to convential therapy: Give
Inj. Rituximab IV 375mg/m^2 once weekly for 4 doses

LUPUS NEPHRITIS: (in severe case)

- **Induction phase; Inj.** Cyclophosphamide IV 500-1000mg/m^2 for 3-6 monthly
  Maintenance: Inj. Cyclophosphamide 500-1000mg/m^2 EVERY 3 months

OR : Azathioprine 2-3mg/kg, Mycophenolate mofetil 2-3g/day P/O (15 BD) are typically use for maintenance therapy

LUPUS CEREBRITIS: Anti-p antibodies increase the risk of lupus cerebritis in SLE Patient

- Features; Cerebrovascular disease, Seizures, meningitis, Neuropathy
- Treatment: Steroid (IV methylprednisolone) + Cyclophosphamide for 6 months,
- If no response to above treatment then we use Rituximab

DIAGNOSTIC CRITERIA: Any 4 out of following!! Feature serially or simultaneously on a separate Occasions

FEATURES	CHARACTERISTIC
Erythematous Malar Rash (50%)	Fixed erythema, flat or raised rashes over face-mainly over cheeks or nose - Butterfly rash
Discoid Rash (20%)	Circular, slightly raised scaly, hyper pigmented rims & de-pigmented atrophic centers
Photosensitivity (70%)	Exposure to UV light causes rash Rashes over neck, back, face
Oral ulcers (40%)	Painless oral or Nasopharyngeal ulcerations
Arthritis (60%)	Non erosive, non-deforming arthritis
Serositis (30 to 50%)	Pleuritis, Pleural effusion, Pericarditis / effusion
Renal Disorder (30 to 35%)	Proteinuria > 0.5g/day 2 cellular casts
Neurological disorders	Seizures (20%). Psychosis (40%) without other causes, depression
Hematological disorders in absence of offending drugs	Hemolytic anemia (10%) Leucopenia (< 4.000 cells/ml) 65% Lymphopenia (< 1500 /ml) 50%, Thrombocytopenia (< 10,000/ml)
Immunological markers	Anti-ds DNA-50% Anti Sm-25% Anti phospholipid - 50%
ANA (98%)	ANA positivity in by immunofluorescence in the absence of drugs which induces ANA+

Antibodies in SLE:

Anti-Smith or Ant-Sm (25%)	Specific for SLE (rarely seen in cutaneous lupus, drug induced lupus, rheumatoid arthritis, juvenile arthritis, mixed connective tissue disease, Raynaud's disease, progressive systemic sclerosis, miscellaneous rheumatic and non-rheumatic diseases
Anti RNP (40%)(U1 RNP)	Not specific for SLE, high titers associated with overlap Syndromes (SLE, mixed connective tissue disease, and scleroderma)
Anti-Histone (70%)	In drug induced SLE BUT can also be seen in idiopathic SLE
Anti Ro(SS-A) 30% Anti LA (SS-B) 10%	Anti Ro(SS-A):Not specific for SLE, associated with SICCA Syndrome, subacute cutaneous lupus, neonatal lupus, congenital heart block Anti LA (SS-B): Decreased risk of Nephritis
Anticardiolipin Ab (IgG> 50 IU) and Lupus anticoagulant	This predisposes Thromboembolism with repeated episodes of fetal loss, Thrombocytopenia, Elevated APTT

Cyclophosphamide (ENDOXAN) infusion Protocol (NIH Protocol)

Step 1: Inj. Solumedrol 500mg + NS (0.9%) IL IV @ 260 drops/min (or over 1 hour)

Step 2:

- Inj. Ondansetron (Onset) 8mg/4ml 1 amp. IV stat before cyclophosphamide infusion
- Inj. Mensa disulfide 200mg before cyclophosphamide infusion

Step 3:

- Inj. Cyclophosphamide 1000 mg in IL NS (0.9%) IV @ 60 drops/min (or over 4 hours)

Step 4:

- Inj. Mensa 200mg IV 2hours after starting cyclophosphamide infusion

Step 5:

- Inj. Mensa disulfide 200mg IV at the end of Cyclophosphamide infusion

Step 6: Inj. Mensa disulfide 200mg IV after 2-hour post cyclophosphamide infusion

OR;

Step 1: Premdication with; (half hour prior to Cyclophosphamide (Endoxan))

- Inj Dexamethasone (Dexa) 8mg IV stat
- **Inj** Ondansetron (Onset) 8mg/4ml 1 amp. IV stat
- Inj Avil 10mg IV stat
- Inj omeprazole 40mg (Risek) IV stat

Step 2: (1 hour prior to Endoxan)

- Inj Normal saline 500ml IV @ 125drops/min or over 1 hour ; 1hour prior to Endoxan
- Inj Mensa 200mg in 100ml NS IV over 1 hour; 1hour prior to Endoxan

Step 3:

- Inj Cyclophosphamide (Endoxan) 1g in 1L NS IV @ 60 drops/min or Over 4 hour

Step 4:

- Inj Mensa 200mg in 100ml NS IV over 1 hour; During Endoxan infusion

Step 5:

- Inj Mensa 200mg in 100ml NS IV over 1 hour; 4 hour after Endoxan infusion

Step 6:

- Inj Normal saline 500ml IV @ 125drops/min or over 1 hour ; 4hour after administration of Endoxan

OR ;

inj onset8mg IV, inj Dexa 8mg IV , inj risek 40mg Iv stat; ½ before endoxn
Inj NS 500ml IV over 1 hour ; 1 hour before Endoxan
Inj Endoxan 1g in 1L NS IV over 4 hour
Inj Mena 200mg in 100ml NS IV; At 0hour, 4hour, 8hour of Endoxan infusion

ADVICE;

- ❖ Monitor for any adverse effect (itching, rash, SOB, fever, palpitation, hypotension)
- ❖ Vital monitoring
- ❖ Repeated bladder voiding
- ❖ Continue Rx as advised

DRUG INDUCE SLE (DIL)

Autoimmune phenomenon where a drug exposure leads to development of SLE like features

Chief Complaint: less severe than SLE

- Skin rash (most common Clinical presentation)
- Fever, arthralgia, myalgia, serositis
- No renal & neurological involvement, or other features of SLE

Cutaneous; Malar rash, photosensitivity, Purpura, Erythema nodosum, sub-acute cutaneous lupus erythematosus (SCLE) rash

Past Hx: Drug history

Investigation:

1) **Anti-histone antibody** (common DIL but also seen in SLE)
2) **ANA (Positive), Anti-dsDNA (Negative)**
3) **Complement level C3, C4 (normal)**

Causes: Procainamide & Hydralazine (highest incidence causing DIL), other drugs are
INF-Alpha, Isoniazid, Rifampicin, Phenytoin, PTH Penicillamine, Infliximab, minocycline, methyldopa, Chlorpromazine, sulfasalazine Carbamazepine, Ethosuximide, Quinidine

Rx: **Date:** **Time:**

Mainstay Treatment: Recognition and discontinuation of the Offending drug

For mild manifestation: NSAIDs + Steroids

- **Tab Naproxen 500mg (Neoprox, Synflex)**
  1+1+1 (if having pain) **OR**
  Tab CeleCoxib 100mg (Celbex) 1+0+1
- **Cap Esomeprazole 40mg (Nexum)**
  1+0+0 before breakfast

OSTEOARTHRITIS (OA)

Definition: A degenerative disorder with minimal articular inflammation , usually affect old age people

Chief Complaint:

- No Systemic symptoms
- Pain in knee, hip, neck, DIP,PIP but not MCP
  - Insidious onset of pain over months to years
  - Intermittent nature
  - Mainly related to movement & weight bearing
  - Less than 15 minutes of morning stiffness
  - Pain gets better with rest
- **Joint involvement: In OA**
  Knee > hands > hip > Lumber > cervical spine

O/E: Vitals (Pulse, BP, SPo2%, Temp)

Joint examination:

- Bony swelling around the joint margin
- Deformity, usually without instability
- Muscle weakness and wasting
- Crepitation , Restricted movement
- Heberden nodules, Bouchards nodules

Investigation:

1) **X- Rays of involved joint:**
   - ✓ Loss of joint space
   - ✓ Increase Subchondral bone density
   - ✓ Osteophyte
   - ✓ Bony Cyst (Subchondral cyst)
   - ✓ Subarticular sclerosis

Rx: **Date:** **Time:**

- **Exercise, Physiotherapy and If obese:** Reduce weight
- **Tab Naproxen 500mg (Neoprox, Synflex)**
  1+1+1 (for pain) **OR**
- **Tab Paracetamol + Tramadol (Tonoflex-p)**
  1+0+0 or 1+0+1 **OR**
- **Tab CeleCoxib 100mg (Celbex)** 1+0+1
- **Cap Esomeprazole 40mg (Nexum, Ezomol)**
  1+0+0 before breakfast (till taking NSAIDs)
- **Diclofenac gel (Voltral emol , voren)**
  Apply locally (on affected area) 4 times a day
- **Tab Chondroitin + Glucosamine**
  1+0+1 (only recommended in hand OA)

If not responding to NSAIDs intra-articular steroids are recommended in Knee or 1st CMC Joint (Carpometacarpal joint)

- **Inj. Triamcinolone 40mg/ml (KENCORT-A)**
  40mg intra-articular. Not more than 4 times a year

If Gonococcal arthritis: then add

- **Tab Ciprofloxacin 500mg (Cipval)** 1+0+1 for 14-21 days
- **Cap Doxycycline 100mg (Vibramycin)** 1+0+1 for 14

Surgery: If not responding to above Treatment go for
Osteotomy, Total joint replacement surgery

- ➢ Total knee or hip joint replacement surgery
- ➢ Arthroscopy: only if presence of locking or if symptomatic meniscal tears/ cruciate ligament damage is suspected

REACTIVE ARTHRITIS

Definition: A Sterile inflammatory process that is triggered by an extra articular infection

- Reiter's Syndrome: It is a reactive arthritis with Arthritis, urethritis and Conjunctivitis
- Poncet's disease (PD) it is a form of reactive arthritis that develops in patient with active tuberculosis (TB) It is rare, non-destructive para-infective symmetric polyarthritis. in case of

unexplained atypical arthritis associated with no-articular TB, PD should be considered

Chief Complaint:

- Pain, Swelling of large lower limb joints
- Morning Stiffness, Fever, weight loss
- Usually young male, fever

Past Hx: Bloody diarrhea

Investigation:

5) **CBC with ESR, CRP** (ESR, CRP raised)
6) **Synovial fluid analysis**
7) **X-rays of affected joints**
8) **Urine C/S** (culture & sensitivity)
9) **Highly vaginal Swab:** Chlamydia

RX on discharge;

- **Cap Doxycycline 100mg (Vibramycin)** BD 14days
- **Cap Omeprazole 20mg (Zolbi)** BD before meal
- **Tab Naproxen 500mg (Neoprox ,Synflex)** 1+0+1 (if pain present)

Rx: Date: Time:

If Severe monoarticular synovitis:

- **Inj. Triamcinolone 40mg/ml (kenacort-A)** 1 vial intra-articular stat Not > 4 times a year

If severe polyarthritis then:

- **Tab prednisolone 5 mg (deltacortil)** 4+0+0

If chlamydial infection is diagnosed then:

- **Cap Doxycycline 100mg (Vibramycin)** 1+0+1 - 14 days **OR**
- **Tab Azithromycin 500mg (Azitma)** 2-Tab stat
- **Tab Metronidazole 400mg (Flagyl)** TDS 7days

If persistence marked Symptoms/recurrent arthritis/severe Keratoderma blennorrhagica;

- **Tab Methotrexate 2.5 mg (Cytotrexate)** 3 tablets every Friday (once weekly)
- **Tab Folic acid 5mg** 1 tab daily except Friday - Continue

ANTIPHOSPHOLIPID ANTIBODY SYNDROME (APS)

A primary APS is diagnosed in patients who have recurrent venous or arterial occlusions, recurrent fetal loss, or thrombocytopenia in the presence of antiphospholipid antibodies but not other features of SLE.

2)SLE with APS: Patients with SLE can also have APS and have ↑ risk of thromboembolic disease

Chief Complaint: Hypercoagulability, with recurrent thrombosis in either the venous or arterial circulation. Thrombocytopenia is common.

- Pregnancy losses (recurrent fetal loss)

Catastrophic APS (CAPS): Small subset of patient with APS) may develop widespread thrombotic disease with organ damage, referred to as CAPS

1) Evidence of involvement of three or more organs, systems, and/or tissues
2) Development of manifestations simultaneously or in less than a week
3) Confirmation by histopathology of small vessel occlusion in at least one organ or tissue
4) Lab confirmation of the presence of APL ab (lupus anticoagulant, anti-cardiolipin antibodies, &/or anti-β2-glycorprotein abs)

Rx: Date: Time:

- **Maintain:** Airway, breathing, circulation
- **Tab Aspirin 81mg (Ascard)** 1+0+0 **OR**
  Tab Clopidogrel 75mg (Lowplat) 1+0+0
- **Tab Hydroxychloroquine 200mg (HCQ)** OD or BD

During pregnancy:

In women with APS to prevent pregnancy complication :

S/C heparin & low dose aspirin

- For women with APS & one or more pregnancy losses at or after 10 weeks of gestation

Tab Aspirin 75mg (Ascard) 1+0+0

Resistance APS or catastrophic APS (CAPS):

IV heparin + high dose of corticosteroid +

IV immunoglobulin(IVIG) or Plasmapheresis

For CAPS Patient resistance to standard therapy:

Rituximab or Eculizumab

Criteria for diagnosis of APS Syndrome:

CLINICAL CRITERIA	Laboratory Criteria:
❖ **Vascular thrombosis;** 1 ≥ clinical episodes of arterial, venous, or small-vessel thrombosis, occurring within any tissue or organ ❖ **Complications of pregnancy** ➢ 1 ≥ unexplained deaths of morphologically normal fetuses at or after the 10th week of gestation; or ➢ 1 ≥ premature births of morphologically normal neonates at or before the 34th week of gestation; or ➢ 3 ≥ unexplained consecutive spontaneous abortions before the 10th week of gestation	Laboratory Criteria: ❖ Anticardiolipin (aCL) antibodies ➢ Anticardiolipin IgG or IgM antibodies present at moderate or high levels in the blood on two or more occasions at least six weeks apart ❖ Lupus anticoagulant (LA) antibodies ➢ LA antibodies detected in the blood on two or more occasions at least six weeks apart. ❖ Drugs associated with aPL formation include the phenothiazine, hydralazine, procainamide, and phenytoin. However, because these medications usually do not lead to the production of antibodies to ß2GPI, they never associated with clinical events

Dose of Warfarin:

INR	Warfarin dose adjustment	Currently daily dose (mg)				
		2	5	7.5	10	12.5
		Adjusted daily dose (mg)				
1-2	Increase the dose and test the INR after 2 days	5.0	7.5	10	12.5	15
2-3	No dose adjustment	..	..	..	..	..
3-5	Decrease dose for 2 days, then test INR	12.5	2.5	5	7.5	10
6-9	Stop warfarin for 2 days. then test INR and restart a lower dose Test INR every 24 hours	1.25	1.25	2.5	5	7.5
10-18	Stop for 2 days. test INR 8th hourly Then restart a lower dose	0	0	1.25	2.5	5
>18	Discontinue warfarin/reversal of anticoagulation (IV Vitamin K 10 mg, Fresh Frozen)					
In case of any bleeding - Discontinue warfarin. Treat with IV Vitamin K 10 mg, Fresh Frozen Plasma Factor VII concentrate						

Anticoagulation

- **Heparin / Low molecular weight heparin** — in acute conditions, in pregnancy.
- The aPTT is used to monitor therapeutic-dose unfractionated heparin; routine monitoring is not required for low-molecular-weight heparin (LMWH).
- Caution in PT/INR monitoring — Elevated baseline PT is much less common than elevation of baseline aPTT in patients with APS, Even then prolongation of the baseline PT is seer in approximately 5 to patients due to a lupus anticoagulant (LA) effect
- **Warfarin:** start as soon as possible with heparin, 10 mg /day, taper the dose according to INR. Add a low-dose aspirin (75 or 81 mg OD) in selected patients with additional cardiovascular risk factors
- **Other anti-coagulants under trail for APS:** direct oral anticoagulant (DOAC; e.g, dabigatran or direct factor Xa inhibitor [apixaban, edoxaban, Rivaroxaban]
- Heparin is usually started with warfarin and is overlapped with warfarin for a minimum of 5 days until the INR has been within the therapeutic range (2.0 to 3.0) for two consecutive days
- A target INR of 2.0—2.5 is recommended for patients with one episode of venous thrombosis; an INR of 3.0—3.5 is recommended for patients with recurring thrombosis or arterial thrombosis.

Hematology

IRON DEFICIENCY ANEMIA(IDA)

Chief Complaint:

- Most common type of anemia
- Weakness, tiredness, angina, headache
- Palpitation, dyspnea on exertion
- Anorexia, indigestion, paresthesia

O/E: Vitals, JACKLET,

- Anemia, koilonychias, atrophic glossitis, Angular chelilosis/ stomatitis
- Pallor- skin, conjunctiva, mucosa
- Pale palmar creases (HB% < 7 g/dl)
- Pigmentation, wide pulse pressure.
- Elevated JVP, tachycardia

Investigation:

1. **CBC:**
   - (HB%;low, MCV < 80 fL
   - MCH, MCHC; low)
2. **Peripheral smear:** Microcytic hypochromic
3. **IRON PROPILE:**(conform iron deficiency)
   - ➢ **Serum ferritin**- low (best for diagnosis)
     - < 12 ng/mL (27 pmol/L) or
     - <30 ng/mL (67 pmol/L) if also anemic
   - ➢ **Serum iron:** Decrease ↓
   - ➢ **TIBC** (Total Iron Binding Capacity)- ↑
   - ➢ **Transferrin saturation**-Reduced↓
4. **Other labs**:
   - ➢ **Serum creatinine** (to rule out chronic renal failure; low erythropoietin)
   - ➢ **TSH:** (to rule out hypothyroidism)
   - ➢ **Bone marrow:** Erythroid hyperplasia
   - ➢ In men and post-menopausal women **upper GI endoscopy**, colonoscopy
   - ➢ **Stool occult + blood** : 3 samples
   - ➢ Stool for ova of ankylostoma duodenal
   - ➢ **Urine examination** for red cells.
5. **OR Simply advice**
   CBC and serum ferritin
   - Iron, ferritin; low
   - TIBC; high

Rx: **Date:** **Time:**

- **Diet rich in iron** (liver, red meat)
- **Tab Ferrous sulphate 200mg (Ferfate)**
  1+0+1 daily before meal for 3-6 months OR
  325mg OD daily or alternate day
  (S/E; Nausea, constipation, black stool)

Parenteral Iron : If

1) Malabsorption
2) Intolerance to oral intake
3) Continue blood loss that can't be corrected
4) GIT diseases (i.e. inflammatory bowel disease)

- **Inj Iron Sucrose complex 100mg/5ml (Bisleri)**
  2 amp in 100ml pladyx or Normal saline
  IV @ 10 drops/min OD for 3-5 days **OR**
  2 amp alternate day as we can give 600mg/week
  (according to daily calculated dose)

Note; there can be anaphylactic reaction so facilities to manage it should be readily available

Additional therapy; Can also add

- **Tab folic acid 5 mg** 1+0+0
- **Inj. Vit B1 + B6 + B12 (Neurobion)** IV alternate day **OR**
- tab Neurobion 1+0+0 daily

Iron deficit; parenteral iron dose calculation:

Total dose in mg = body weight in kg x
(target HB – actual HB) x 2.4 + storage iron
Q: 50 kg patient with HB 8 g/dl, find iron deficit
ANS:
Estimated HB= 13gm & iron storage= 500mg so the Total iron deficit will be
=50 (13 – 8) x 2.4 + 500 = 1100mg

Blood transfusion: If

❖Severe anemia (HB < 8mg/dL) **OR**
❖Heart failure, Angina, Evidence of cerebral hypoxia.

Mentzer index = MCV/RBC count
The mentzer index suggest thalassemia trait if <13 and suggest iron deficiency anemia if >14
Q; Patient with ameia, MCV=55, RBC count= 4.5.what will be the mentzer index?
Ans: MCV/RBC = 55/4.5 = 12.22 (Value is < 13 so it favour thalassemia trait

MEGALOBLASTIC ANEMIA

Chief Complaint:

- Macrocytic anemia, glossitis (smooth atrophic tongue, red tongue during attacks), Weakness.
- SOB , palpitation, headache
- Anorexia, indigestion, weight loss, depression, Hallucination, visual disturbance

Neurological: Peripheral neuropathy, paresthesia of fingers & toes, dementia & optic atrophy

- Subacute combined degeneration (SCD) of cord

Cardiovascular disease; Due to ↑ homocysteine

Diet history : strict vegetarian

O/E: Vitals, JACKLET, Anemia, koilonychia, Chelilosis, skin changes (vitiligo, pigmentation)

Investigation:

1. CBC: (Hb commonly 7 to 9 g/dl, may be normal)
   - ➢ Megaloblastic anemia (MCV >100 fL)
   - ➢ Severe macrocytosis (MCV > 110 to 115 fL)
   - ➢ Reticulocyte count, RBC Count; LOW
   - ➢ Retic count within 2% & MCV, MCH: High
   - ➢ Pancytopenia; Anemia + 1 or more additional cytopenias-leukopenia &/or thrombocytopenia
2. **Peripheral smear:**
   - ➢ Aniso poikilocytosis (erythrocytes of varying size & abnormal shapes)
   - ➢ Macro-ovalocytosis; hyper segmented neutrophils (neutrophils with >5 distinct lobes)
3. **ESR: low for degree of anemia**
4. **Other labs;**
   - ➢ **Serum bilirubin;** Indirect hyperbilirubinemia
   - ➢ **Serum LDH;** Elevated due to hemolysis
   - ➢ **Serum ferritin;** Raised
5. **Special test for vit B12 deficiency**
   - ➢ Serum vit B12 assay (normal 130-770 pg/ml)
   - ➢ Schilling test (in pernicious anemia)
   - ➢ Methyl melonic acid in urine; Increased
   - ➢ Response to vit B12 administration

Date: **Time:**

Rx:

- **Diet;** Rich in vit B12 (Meat, fish, egg, milk)
  - Inj. Cyanocobalamin 1000 mcg (Cyanocobal)
  - 1 ampule IM OD for 1 week Then 1 amp once weekly for 1 month Then 1 amp once monthly for 1 year
  - Then 1 amp early life long OR
  - Inj. Cyanocobalamin 1000 mcg (Cyanocobal)
  - 1 amp IM stat and every 3 days apart-total 6 days and then every alternate day if neurological symptoms present
  - **Tab folic acid** 5mg 0+1+0- for 3 weeks then 1 tab every Friday; for 4 months

NOTE:

If patient has deficient in both vit B12 and folic acid then it is important to treat vit B12 deficiency first to avoid precipitating subacute combined degeneration (SCD) of the spinal cord.

FOLLOW UP: Follow up (after 1 week)

- ➢ Advice CBC & serum electrolyte
- ➢ (Hb% should raised by 1gm/dl)
- ➢ Reticulocyte response begins after 2-3 days and peaks at 6-7 days
- ➢ Hematological picture normalizes in 2 month
- ➢ Sensory neuropathy respond very slowly (6-12 months

Blood transfusion: If needed then diuretics are also recommended to avoid heart failure

Causes of vit B12 deficiency:

- ✓ Diet; strict vegetarian, alcohol
- ✓ Gastric surgeries, use of PPI, Malabsorption states, Congenital; deficiency of intrinsic factor. Pernicious anemia
- ✓ Tape worm infection, tropical sprue

MEGALOBLASTIC ANEMIA

Chief Complaint:

- Macrocytic anemia, glossitis (smooth atrophic tongue, red tongue during attacks), Weakness.
- SOB , palpitation, headache
- Anorexia, indigestion, weight loss, depression, Hallucination, visual disturbance

Neurological: Peripheral neuropathy, paresthesia of fingers & toes, dementia & optic atrophy

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Cardiovascular disease; Due to ↑ homocysteine

Diet history : strict vegetarian

O/E: Vitals, JACKLET, Anemia, koilonychia, Chelilosis, skin changes (vitiligo, pigmentation)

Investigation:

1. CBC: (Hb commonly 7 to 9 g/dl, may be normal)
   - ➢ Megaloblastic anemia (MCV >100 fL)
   - ➢ Severe macrocytosis (MCV > 110 to 115 fL)
   - ➢ Reticulocyte count, RBC Count; LOW
   - ➢ Retic count within 2% & MCV, MCH: High
   - ➢ Pancytopenia; Anemia + 1 or more additional cytopenias-leukopenia &/or thrombocytopenia
2. **Peripheral smear:**
   - ➢ Aniso poikilocytosis (erythrocytes of varying size & abnormal shapes)
   - ➢ Macro-ovalocytosis; hyper segmented neutrophils (neutrophils with >5 distinct lobes)
3. **ESR: low for degree of anemia**
4. **Other labs;**
   - ➢ **Serum bilirubin;** Indirect hyperbilirubinemia
   - ➢ **Serum LDH;** Elevated due to hemolysis
   - ➢ **Serum ferritin;** Raised
5. **Special test for vit B12 deficiency**
   - ➢ Serum vit B12 assay (normal 130-770 pg/ml)
   - ➢ Schilling test (in pernicious anemia)
   - ➢ Methyl melonic acid in urine; Increased
   - ➢ Response to vit B12 administration

Date: **Time:**

Rx:

- **Diet;** Rich in vit B12 (Meat, fish, egg, milk)
  - Inj. Cyanocobalamin 1000 mcg (Cyanocobal)
  - 1 ampule IM OD for 1 week Then 1 amp once weekly for 1 month Then 1 amp once monthly for 1 year
  - Then 1 amp early life long OR
  - Inj. Cyanocobalamin 1000 mcg (Cyanocobal)
  - 1 amp IM stat and every 3 days apart-total 6 days and then every alternate day if neurological symptoms present
  - **Tab folic acid** 5mg 0+1+0- for 3 weeks then 1 tab every Friday; for 4 months

NOTE:

If patient has deficient in both vit B12 and folic acid then it is important to treat vit B12 deficiency first to avoid precipitating subacute combined degeneration (SCD) of the spinal cord.

FOLLOW UP: Follow up (after 1 week)

- ➢ Advice CBC & serum electrolyte
- ➢ (Hb% should raised by 1gm/dl)
- ➢ Reticulocyte response begins after 2-3 days and peaks at 6-7 days
- ➢ Hematological picture normalizes in 2 month
- ➢ Sensory neuropathy respond very slowly (6-12 months

Blood transfusion: If needed then diuretics are also recommended to avoid heart failure

Causes of vit B12 deficiency:

- ✓ Diet; strict vegetarian, alcohol
- ✓ Gastric surgeries, use of PPI, Malabsorption states, Congenital; deficiency of intrinsic factor. Pernicious anemia
- ✓ Tape worm infection, tropical sprue

SICKLE CELL ANEMIA

Definition: Abnormal hemoglobin polymerization: substitution of valine for glutamic acid at 6th position of beta globulin poly-peptide chain. When HbS is deoxygenated they become sickle shaped cell.

Chief Complaint:

Anemia: Patients can present with chronic, compensated hemolytic anemia with episodes of acute worsening. Other contributing factors to chronic anemia include low serum erythropoietin (e.g, due to renal disease or increased plasma viscosity) and/or folate or iron deficiency

- Sickled cells undergo hemolysis, with a RBC lifespan of around 17 days (one-seventh that of normal RBCs), leading to chronic hemolytic anemia
- Iron deficiency is not common in Sickle cell anemia as such. Iron deficiency is common in individuals with hemoglobin SC disease and other sickle variants
- Patients become symptomatic during infections, fever, excessive exercise, anxiety, abrupt changes in temperature, hypoxia and dehydration
- In Sickle cell disease, RBCs become deformed and rigid, so they cannot pass through small capillaries and they produce tissue infarctions

Family history: usually Positive

Investigation;

1) **CBC, RBS**
2) **Hemoglobin Electrophoresis:**
   Elevated HbS : In Sickle cell anemia(i.e., HbSS), there is 0% HbA, < 2%.HbF, normal amount of HbA2 & The remainder HbS.

Rx **Date:** **Time:**

During vaso-occlusive Crisis :

- Aggressive rehydration, 02 inhalation
- For pain morphine
- For infection antibiotic with
- Exchange transfusion

Blood transfusion: Helpful in

1. Severe anemia

2. Benefits in Patient with neurologic symptoms, chest syndrome or-an unusually severe painful crisis

3. Long term transfusion maybe indicated to prevent recurrent CVA & with growth problems in childhood but again the risk of infections complications & iron overload must be balanced against the benefits of transfusion

4. Maintain Hb at level of 10 - 15 g/dl

Hydroxyurea: Increase HbF

• Tab Hydroxyurea (Hydrea) 500-750mg OD

Other management:

• Bone marrow transplantation only in Children

• Agent blocking RBC (dehydration and vascular adhesion: clotrimazole, magnesium

Prophylaxis:

• **Tab Folic Acid 5mg** 1+0+0.

• **Tab Penicillin V**

dose: 3 months to 3years: 125mg p/o-BD

3 years to 5years: Increased to 250mg BD

• **Pneumococcal vaccination**

Newer Agent:

- L-glutamine, Voxelotor, crizanlizumab

Infarction crisis: Painful crisis: Intermittent episodes of Vaso-occlusion in connective. And musculoskeletal structures produce severe pain, tenderness, inflammation and fever:

- specific triggers for pain: cold, wind, low humidity dehydration, stress, alcohol & menses
- Hand -foot syndrome : Repeated episodes of infarction of the digits and leads to dactylitis
- Mesenteric Infarction - Acute abdominal pain, Acute surgical abdomen (g, cholecystitis)
- Cerebral Infarction- Stroke and TIA, Renal necrosis - Renal failure and Priapism
- Leg ulcers, Acute Chest Syndrome: Chest pain, Tachypnea, fever, cough, hypoxia.
- Recurrent Splenic Infarct: Leads to autosplenectomy

Bone problems: Osteoporosis. Avascular necrosis and osteomyelitis.

Haemolytic crisis and sequestration crisis:

- Sudden massive pooling of blood in large spleen and produces acute fall in hemoglobin
- Splenic sequestration crisis is characterized by an acute drop in Hb% caused by vaso-occlusion within the spleen and splenic pooling of RBCs large volume of blood can be sequestered in the spleen, leading to hypovolemic shock and death. And chronic hemolysis leads to cholelithiasis.
- **Aplastic Crisis** : Aplastic Crisis - Bone marrow suppression due to erythrovirus 19(parvovirus B19)
- Aplastic crisis presents with acute drop in Hb% and a markedly reduced number of reticulocytes in the peripheral blood (typically, reticulocytes <1.0 percent, absolute reticulocyte count <10,000 per microL).

THALASSAEMIAS

Chief Complaint:

1. **B-thalassemia major** (Cooley's anemia)

- Severe anemia - hypochromic: Patients with thalassemia major have severe and lifelong transfusion-dependent anemia. Symptoms begin during late infancy (around age, 6 - 12 months)
- Ineffective Erythropoiesis, Hemolysis, Increased bone marrow activity, Chronic blood transfusion leads to iron overload
- Expansion of marrow space, Chipmunk face: frontal bossing (Mongolian face), Growth retardation, fractures of long bones
- Hepatosplenomegaly, Leg ulcers, gall stones
- Congestive Cardiac Failure

2. **Thalassemia Intermedia:**

- Anemia but are not transfusion dependent during childhood. But some patients may develop features of T. major

3. **Thalassemia minor / trait** (carrier State)

- Mild microcytic hypochromic anemia, low MCV, normal ferritin (important to not misdiagnose Thalassemia trait as from iron deficiency anemia)

Past history: Positive family history

O/E: Vitals, JACKLET, Spleen examination

Investigation:

1) **CBC** (low Hb, microcytic hypochromic Anemia)
2) **Peripheral smear**; Acanthocytes & target cells
3) **Bone marrow Study** (marrow hyperplasia)
4) **Osmotic fragility test**
5) **Hb electrophoresis, Coombs test (negative)**
6) **High Performance liquid chromatography** (HPLC) (for accurate diagnosis)
7) **X-rays Skull** (Hair on end appearance)
8) **Iron profile**

Rx: Date: Time:

- Diet : normal, Iron restriction

If Mild thalassemia (alpha thalassemia trait or beta thalassemia minor) : No treatment

If Hemoglobin H disease:

- Tab folic acid 5 mg 2 tab daily per oral
- Avoid iron supplement & sulfonamides

If Severe thalassemia:

A. Blood transfusion (20ml/kg)

- ✓ To maintain mean Hb of 12g/dL
- ✓ Reduce tissue Hypoxia
- ✓ Suppress endogenous hemopoiesis which is ineffective
- ✓ β-Thalassemia major Life-long transfusion

B. To prevent iron overload (due to blood transfusion); iron chelating agent :

- **Inj. Deferoxamine** (Defferal DFO) SC or IV (25-35 mg/kg/day) **OR**
- **Tab Deferasirox (Ansura)** 100, 250, 400, 500 mg, 1+0+0 in H_2O, apple or orange juice or on empty stomach 30 min before or after meal. **Starting dose**: 20 mg/kg/day **Increase by** 5-10 mg/kg every 3-6 months **with**
- **Tab Deferiprone** 500mg (**Ferinil, cap kelfer**) Dose: 75mg/kg /day in 3 doses 1+1+1 with
  - ❖ Simply inj deferoxamine + tab ferinil)
- **Tab Folic Acid 5mg** 0+0+ 1- Continue
- **Tab Ascorbic Acid** (cecon) 500mg 1+0+0

Treatment of choice :

- ➢ Allogeneic stem cell transplantation for β-thalassemia major is the TX of choice
- ➢ Bone marrow transplantation in young patients those with sever disease

In splenectomy:

1) INFLUENZA VACCINE: YEARLY
   INJ. INFLUVAC TETRA 0.5 ml IM STAT
2) PNEUMOCOCCAL VACCINE: 5 YEARLY
   INJ Prevenar 13 2mcg/0.5ml IM STAT

	Clinical features	Laboratory features
Thalassemia major	• Anemia • Hepatosplenomegaly • Growth failure	• Hb : < 7g/dL • HbF : > 90% • HbA2 : normal or high • HBA : usually absent
Thalassemia intermedia	• Milder anemia • Thalassemia facies Hepatosplenomegaly	• Hb : 8-10 g/dL • HbF : >10% • HbA2 : 4-9%, if > 10% suggests HbE • HBA : 5-90%
B-Thalassemia Trait	• Normal to mild anemia • No organomegaly	• Hb : < 10 g/dL • MCH : < 27 pg • HbF : > 2.5-5% • HbA2 : 4-9% if >20% suggestive HB Trait • HBA : > 90%

Splenectomy indicated in

- Severe anemia due to thalassemia (e.g, Persistent symptomatic anemia not due to iron deficiency or other non-thalassemia conditions)
- A dramatic increase in transfusion requirement (e.g, doubling of transfusion requirement over the course of one year) **AND** Growth retardation
- Hypersplenism leading to other cytopenias (leukopenia [e.g, absolute neutrophil count below 1000/microL], thrombocytopenia with a platelet count <10,000/microL)
- Symptomatic splenomegaly (e.g, abdominal discomfort, early satiety)
- Splenic infarction or splenic vein thrombosis

❖ OTHER Treatment

- Luspatercept (ACE-536) is a subcutaneous agent that improves RBC maturation. Approved for the treatment of adults with transfusion dependent β-thalassemia to ↓ transfusion requirements
  Dose: SubQ: Initial: 1 mg/kg once every 3 weeks
- Gene therapy Gene therapy to introduce a functional beta globin gene.

Prevention:

- Antenatal diagnosis - Amniocentesis / Chorionic Villus biopsy PCR amplification of fetal DNA

Note: Over transfusion lead to transfusion hemosiderosis this will lead to damage of endocrine glands, Pancreas, Liver, heart (diabetes, cirrhosis, heart block & (CF)

After Transfusion: **Tab Phnoxymethyl Penicillin 250 mg** 1+0+1

HAEMOPHILIA

Hemophilia A: Classical hemophilia factor VIII deficiency, hereditary X-linked recessive females are carrier, male develop disease (so disease occur in males) and Classified as
Severe: < 2% of Factor VIII level, **moderate**: 2 to 10%, Mild 10 to 50% factor VIII level
Hemophilia B: Factor IX deficiency
Acquired hemophilia: Autoantibodies against one of antihemophilic factors (mostly factor VIII)

Chief Complaint:

1. **Male patient with excessive bleeding** tendency following minor trauma usually start after 6months after start walking
2. **Hemarthrosis** (bleeding into joints)
- Mainly: hip, knee or ankle,
- joint inflammation-later joint destruction
3. **Muscle hematomas:** mainly in calf & Psoas
4. **Oropharyngeal:** Bleeding from sites like nose, oral mucosa, & gingiva; also bleeding follow minor trauma or procedures
5. **Intracranial hemorrhage**: Rare
6. **Hematuria, Retroperitoneal bleeding**
7. Past HX: History of prolong bleeding following circumcision, tonsillectomy or minor surgery. Positive family History on maternal Side

O/E: Vitals, Joint examination:
- ✓ Calf muscle & Knee hematoma
- ✓ Knee jerk may be absent

Investigation:

1) APTT: Prolong (Normal: 25-35 but range varies); In hemophilia, the aPTT corrects in mixing studies, unless an inhibitor is present, in patient who have received factor infusions or who have another auto antibody such as a Lupus anticoagulant or an acquired factor inhibitor.
So mixing studies that do not slow correction of a prolong aPTT suggest an alternative diagnosis

2) PT & fibrinogen level: Normal

3) Specific assays for factor VIII & IX : ↓ and levels of Factor VIII: < are reduce but measurement of vWF normal.

Rx: **Date:** **Time:**

- Maintain ABC (airway, breathing, Circulation)
- If bleeding, rest it by Splint, once bleeding has settled. Mobilization, physiotherapy
- **Avoid:** IM injections, trauma, aspirin, (can use Paracetamol for pain or fever).

Hemophilia A:

1. **Mild case** (Factor VIII >0.05-0.4 U/mL): Desmopressin
2. **Moderate to Severe** (Factor VIII <0.05 U/mL);
- **Inj. Factor VIII; (15-40 IU/kg)** or 500U Initial dose: 50units/kg IV stat & then 25U/kg TDS
- **Cryoprecipitate**: Derived from blood & contains a moderately high con of factor VIII (but not IX). So it is effective for joints and muscle bleeds.

Hemophilia B (Christmas disease) :
- ➢ Facctor IX Concentrate (15-40 IU/kg)
- ➢ Fresh frozen plasma; when facto concentration not avalaible

Hemophiliac A with inhibitors:
Inj. Emicizumab 3 mg/kg SC once Pet week for first 4 weeks followed by 1.5 mg/kg week

Mixing Study: The mixing study is used to distinguish between a coagulation factor deficiency, such as factor VIII deficiency, and a factor inhibitor, such as a specific factor VIII inhibitor or lupus anticoagulant.
- ➢ The test is performed when a patient has an unexplained prolongation of a coagulation screening assay, such as aPTT.
- ➢ The mixing study is usually done by mixing equal volumes of patient plasma and pooled normal plasma and then repeating the aPTT on the mixture. The basic principle is that the normal plasma contributes a sufficient concentration of clotting factors to "correct" for a factor deficiency.
- ➢ A mixing study that corrects the aPTT is characteristic of factor deficiency, whereas a mixing study that does not correct the aPTT indicates a factor inhibitor.

Acquired haemophilia:

- Acquired hemophilia is an uncommon but severe bleeding disorder. It is caused by the development of auto-antibodies directed against one of the antihemophilic factors, most frequently factor VIII (FVIII).In about half of the cases diagnosed with acquired hemophilia, no cause or precipitating factor is recognized
- Immunological Disorders (17 to 18%) Associated with SLE, RA, Sjogren syndrome, connective tissue diseases, autoimmune thyroiditis, Grave disease, APS, multiple sclerosis, temporal arteritis, myasthenia gravis, Good-pasture syndrome, and other autoimmune diseases
- Obstetrical Causes: Post-partum state (one of the common causes of acquired hemophilia
- Hematological and Oncological Causes: Diagnosis of cancer, precancerous states, solid tumors (lung, prostate, pancreas, breast), hematological neoplasia, chronic lymphocytic multiple myeloma, Waldenström macroglobulinemia, [3] lymphoproliferative mal non-Hodgkin lymphoma, monoclonal gammopathy of undetermined significance & polymyalgia rheumatica.
- Dermatologic Disorders: Psoriasis, pemphigus, and epidermolysis bullosa.
- Pharmacological Causes: Beta-lactam antibiotics, penicillin, and non-beta- lactam antibiotics, interferon's, Clopidogrel, NSAIDs, amiodarone, rivastigmine, heparin, phenytoin, chloramphenicol, methyldopa, and fludarabine.

Infectious Diseases: Acute hepatitis B and C infections and others.
Transplant Related Disorders: Chronic graft versus host disease.
Gastroenterological Diseases: Inflammatory bowel disease.
Pulmonary Diseases: Asthma, COPD.
Transfusion of blood products

CHRONIC LYMPHOCYTIC LEUKEMIA (CLL)

Chief Complaint:

- Asymptomatic
- Night sweat, weight loss , Fever

O/E: Vitals, JACKLE,

- Hepatomegaly, Splenomegaly
- Lymphadenopathy, Body tenderness

Investigation:

1) **CBC with peripheral smear**
2) **Bone marrow biopsy**

Staging:

Clinical stage A:

- No anemia and thrombocytopenia
- < 3 areas of lymphoid involvement

Clinical stage B:

- No anemia and thrombocytopenia
- ≥ 3 areas of lymphoid involvement

Clinical stage C: Anemia and or thrombocytopenia regardless area of lymphoid involvement

Rx: **Date:** **Time:**

1) stage A: no treatment

2) Progressive stage A, B or C

Indication for treatment:

- Evidence of bone marrow failure
- Massive or progressive lymphadenopathy or splenomegaly
- Constitutional symptoms (night sweat, fever, weight loss) & Rapidly ↑ lymphocyte count
- Autoimmune hemolytic anemia
- Thrombocytopenia (low platelet count)

Correction of anemia: blood transfusion
Correction of bleeding: platelets transfusion
Immunoglobulin replacement: if hypogammaglobinemia,
Radiotherapy: if lymphadenopathy causing discomfort or local obstruction, Splenectomy,
Specific : (cyclophosphamide + rituximab)
For better management; Refer to oncologist/hematologist

ACUTE MYELOID LEUKEMIA (AML)

Definition: AML is a malignant disease of bone marrow in which hematopoietic precursors are arrested in an early stage of development, age > 65 years.

Chief Complaint:

- Anemia- Easy fatigability, palpitation.
- Granulocytopenia (↓ mature white cells)
- Fever and recurrent infection, DIC
- Thrombocytopenia- bleeding tendency
- Abdominal discomfort, early satiety, Tumor lysis syndrome
- Headache or focal neurological complaints

O/E: Vital, JACKLET

- Appearance : toxic, ill looking
- Splenomegaly, hepatomegaly
- Gum hypertrophy: in monocytic leukemia
- Skin infiltration: (in monocytic leukemia)
- Chloroma – mass lesions in soft tissues
- Bony tenderness: +,lymphadenopathy;+

Investigation:

1.CBC:(anemia; normocytic normochromic)

- Thrombocytopenia, TLC 15000/mm^3, it can go up to > 100,000/mm^3) **ESR:** Raised

2.Serum uric acid, LDH, phosphatase: ↑

3.Peripheral smear: Numerous blast cells

4.Bone marrow : (20% myeloblasts)

- Presence of aura rod in cytoplasm of blast cells and (blast cells > 20 %)

Rx **Date:** **Time:**

- **Inj. Ceftriaxone 1gm (Oxidil, Rociphen)** 1 vial IV stat and BD (ATD)
- **Inj. Omeprazole 40 mg (Risek) IV OD**
- **Correction of anemia**: Blood transfusion
- **Control of bleeding:** Platelet transfusion Whole blood (if platelet not available)
- Maintenance of nutrition, fluid, electrolyte.

Chemotherapy induction regimens for AML

1. **3+7 regimens : Cytarabine + Daunorubicin**
   Cytarabine : 100-200 mg/m^2 daily as continuous infusion for 7 days
   Daunorubicin: 60-90 mg /m^2 IV push on each of the following 3 days of treatment.
2. **Cytarabine (HIDAC) + DENAURUBIN**
   Cytarabine : 1-3 g/m^2 BD for a total of 12 doses
   Daunorubicin: 45 mg/m^2 IV push for 3 days following cytarabine
3. **Cytarabine + Idarubicin**
   Cytarabine 100-200 mg/m^2 doses daily as continuous infusion for 7 days
   Idarubicin: 12-13 mg/m^2 IV push on each of first 3 days of treatment

❖ **Better to refer hematologist/oncologist**

CHRONIC MYELOID LEUKEMIA (CML)

Chief Complaint:

- Asymptomatic
- Lethargy, weight loss, sweating, abdominal discomfort and Past history: If any

O/E: Vital, JACKLET, Lymphadenopathy: +/-

- Splenomegaly, hepatomegaly

Investigation:

1) CBC, peripheral smear, Serum LDH, uric acid
2) Bone marrow study: Hypercellular, megakaryocytosis
3) Immunophenotyping, immunohistochemistry

Rx: **Date:** **Time:**

In chronic phase:

- **Tab Imatinib 400 mg** 1+0+1 for 18 months

Not responding to tkt therapy: Allogeneic HSCT
For palliation: hydroxycarbamide
Women planning pregnancy: interferon
In accelerated phase or blast crises
Tab Dasatinib 100 mg OR Tab Nilotinibe 200 mg
In younger and fitter patient: Allogeneic HSCT
For better management: Refer to oncologist

POLYCYTHEMIA

Definition: Polycythemia is increase of RBC number above normal range

Chief Complaint:

- Injection of the Conjunctival small vessels & /or engorgement of the veins of the optic fundus
- Headache, Epistaxis, Vertigo, tinnitus
- Pruritus following a warm bath or shower (aquagenic pruritus) is characterized by strong sensations in the skin following contact with water without visible changes in the skin
- Erythromelalgia, or burning pain in the feet or hands accompanied by erythema, pallor, or cyanosis, in the presence of palpable pulses
- Facial plethora (ruddy cyanosis), systolic Hypertension
- Venous – Arterial thrombosis,
- Transient visual disturbances (e.g, transient ocular blindness [amaurosis fugax], scintillating scotoma, ophthalmic migraine)
- Hyperuricemia; secondary GOUT, Peptic ulcer disease, Splenomegaly

O/E: Vitals, JACKLET, SPO2% : normal

Investigation:

1) **CBC:** (↑ Hb, ↑Hct, ↑TLC, ↑ PLATLET) Hb >18.5g/dl in men, Hb >16.5g/dl in women & hct: > 60%
2) **JACK 2 mutation** (+ in primary polycythemia) Most accurate test
3) **Bone marrow biopsy:** marrow hyper cellularity
4) **Erythropoietin level:** ↓only polycythemia rubra vera (low/normal EPO levels are highly specific for PV, levels above normal are unusual & suggest Secondary erythrocytosis)
5) **Serum uric acid**
6) **LAP** (inceased in polycythemia rubra vera)

NOTE: Suspect 2ndry polycythemia if splenomegaly is absent & the high hematocrits is not accompanied by increase in other cells

Rx: **Date:** **Time:**

- Stop smoking, weight reduction (if obese)
- Supplemental O_2 therapy: low flow continuous O_2 may improve erythrocytosis in patient with CLD
- Avoid diuretics,
- Removal of tumor (if present)
- Correction of underlying renal disease

Periodic phlebotomies: (every 3 month)

Therapeutic phlebotomy is the mainstay of controlling RBC mass (i.e., hematocrit control) in Polycythemia Vera (PV)

- ✓One unit of blood (approximately 500 mL) is removed weekly until the hct is < 45% [the hematocrit fall by 3% points in a normal sized adult (e.g. from 46 to 43%)].
- ✓A diet low in iron may also increase the intervals between phlebotomies.

Maintain Hb at

- ✓Males 14 gm% (hematocrit <45%)
- ✓Females 12 gm% (hematocrit <42%)

For Erythromelalgia: Aspirin 100mg

Tab Aspirin 100 mg 1+0+0

For thrombocytosis:

- **Tab Hydroxyurea (Hydrea)**
  Dose: 500 – 1500mg/d, adjusted to keep platelets < 5 lac without reducing the neutrophil count to < 2000/mm3

For elevated Uric acid level: Asymptomatic hyperuricemia (<10mg %): No therapy but Allopurinol should be administered to avoid further elevation of the uric acid when chemotherapy is employed to reduce splenomegaly or leukocytosis/to TX pruritus.

Treatment for Secondry polycythemia:

O2 (for hypoxia), CPAP(for sleep apnea) Surgery (for Epo secreating tumors)

Additional treatment:

- **Anagrelide** (Dose – Initial: 0.5 mg 4times daily or 1 mg twice daily).
- **INF** – pegylated IFN or busulfan (starting dose is 2 to 4 mg/day) are acceptable alternatives for patients with PV who are intolerant of Hydroxyurea or fail to achieve adequate control of symptoms or hematocrit with Hydroxyurea.
- **Ruxolitinib** 20 mg twice daily – for patients with intermediate or high risk myelofibrosis

Classification: (RBC mass to differentiate between Relative and absolute polycythemia)

A. **Relative polycythemia** – Due to reduce plasma volume
   1. Dehydration 2. Gaisbock`s Syndrome
B. **Absolute polycythemia;** due to increased Red cell mass
   1. Primary (polycythemia Vera) 2. Secondary

Secondary polycythemia

- **Hypoxia:** High Attitude, Smoking, Chroic kidney disease, Cardiac Shunt (RTOL)
- **Renal:** Carcinoma, cyst, hydronephrosis **Tumor:** which produce erythropoietin like substances
- Epatoma, Adrenal adenoma, Pheochromocytoma, Meningioma, Cerebral hemangioblastoma.

Gaisbock`s Syndrome (Stress or Spurious erythrocytosis): associated with systemic Hypertension

- This Relative polycythemia, Mainly occur in hardworking male, especially smokers

Polycythemia Vera (Primary polycythemia) PV

- Polycythemia Vera (PV, polycythemia rubra Vera, maladie de Vaquez) is a myeloproliferative neoplasm (MPNs)
- PV is different clinically from others PMNs by the presence of an elevated RBC mass
- Exon 14 mutation of the JAK2 gene – in multiple studies, 95 to 97% of PV patients have the V617F mutation in exon 14 of the JAK2 gene (Janus kinase 2), which is not seen in normal persons and those with secondary polycythemia
- Thus when JAK2 mutation present it distinguish PV from secondary polycythemia

APLASTIC ANEMIA

Definition: It is a disorder in which there is aplasia of the bone marrow with pancytopenia

a) Primary aplastic anemia: congenital (Fanconi and non-Fanconi), idiopathic (acquired)
b) Secondary aplastic anemia: drugs (indomethacin, sulphonamide, penylbutazone, cytotoxic drug), Ionizing radiation, chemical (hair dye, DDT), viral hepatitis, EBV
c) Pure red cell aplasia; very rare – Para virus infection, chronic congenital, chronic acquired.

Chief Complaint:

- Fever- acute onset and high grade
- Generalized body aches, weakness,
- Bleeding manifestation: Petehiae, Purpura, ecchymosis
- Anorexia, indigestion, Palpitation, dyspnea

On examination:

- Vitals;(pulse, BP, Spo2%, temp, RR)JACKLET
- Lymphadenopathy, Hepatosplenomegaly

Investigation:

1. **CBC (Pancytopenia)**
   - Hb; is reduce may be even 3g/dl
2. **Special smear;** Normocytic, normochromic
   - Reticulocytes are few or absent
3. **MCV, MCH, MCHC**: are normal
4. **ESR ;** raised 50 to 100 mm in one hour
5. **Bone marrow**; Hypocellular (Most accurate test)

Rx **Date:** **Time:**

- Diet: Maintenance of nutrients, Bed rest
- Withdrawal of offending agent

A. Supportive:

- **Inj Ceftriaxone** 1 gm (Oxidil, Rocephin) 1 vial IV stat and BD (after test dose)
- **Blood transfusion:** for anemia

B. If bleeding: Platelets/RBC transfusion
C. Maintenance of fluid and electrolyte
D. Immunosuppresive agents (e.g, Antithymocytes globulin plus Cyclosporine)
E. If age <35 years & age 35- 50 years with no comorbidities go for: Bone marrow allograft
F. Older patient/ no suitable donor:

- **Tab cyclosporine** 100 mg (Cipol-N, Sandimmun neural) 6mg/kg BD several years

G. For better management: Refer to oncologist

HODGKIN'S LYMPHOMA

Chief Complaint:

- Focal / generalized Lymphadenopathy Lymph node are painless, mobile & rubbery Cervical, mediastinal, axillae, groin, Facial edema and Spread is contiguous.
- Extra nodal involvement (25%) :Brain, bone marrow rare
- B Symptoms/Constitutional Symptoms: Fever, Night sweats, weight loss, fatigue, Anorexia.
- Pruritus, pain associated with alcohol intake

O/E: Vitals, JACKLET

- Hepatomegaly+, Splenomegaly+ But rare in initial stage.

Investigation:

CBC: (Anemia, lymphopenia), RFTs, **HIV by Elisa**

1) **ESR**: Elevated and **serum LDH**: Elevated
2) **CXR** (to see mediastinal widening/mass)
3) **FNAC/Biopsy of Lymph node:**

Classical HLA is diagnosed on Lymph node biopsy Reed-Sternberg cell.

4) **For staging:** CT chest & abdomen.
5) **Bone marrow biopsy** (in selected patient)

In Patients with cytopenias & negative Positron emission tomography (PET) findings.

6) 18F-Flurodeoxyglucose-PET (FD4-PET)

Rx: **Date:** **Time:**

- **Diet:** Maintained of nutrition, Fluid & electrolyte and Bed rest
- **Inj. Ceftriaxone 1gm (Oxidil, Rocephin)** 1 vial IV Stat and BD (ATD)
- **Correction of anemia:** Blood transfusion.
- **For to control bleeding:** Platelet transfusion.
- **Inj. Paracetamol (Provas)** IV Stat and SOS
- **Inf. NS 500ml IV TDS**
- **Inj. Omeprazole 40mg (Ruling)** IV OD

Combination chemotherapy (Main TX):

ABVD (Doxorubicin, bleomycin, vinblastine, decarbonize) every 14 days in 98-day cycles

Adverse prognostic factors.

1. ESR > 50 or any B Symptoms.
2. Mediastinal mass ratio (MMR) > 0.33 on upright CXR (mediastinal mass is measured on CXR by the MMR, which is the maximum width of mass/ max intrathoracic diameter)
3. Bulky mediastinal lymphadenopathy > 10 cm diameter **4.** >3 node of sites. ,
5. Any extra nodal lesions, **6.** Age > 50 years

Sub staging of Lymphoma

A: Asymptomatic
B: Symptoms (Fever, night sweat, weight loss, >10% of body weight over 6 months)
E: Involvement of a single, extra-nodal site, contiguous or proximal to known nodal site
S: Splenic involvement
X: Bulky nodal disease: nodal mass > 1/3 of intrathoracic diameter or 10cm in dimension.

Lugano classification for staging of lymphomas:

Stage I- Involvement of a single lymph node region (e.g, cervical, axillary, inguinal, mediastinal) or lymphoid structure such as the spleen, thymus, or Waldeyer's ring.
Stage II- Involvement of 2≥ lymph node regions or lymph node structures on the same side of the diaphragm. Hilar nodes should be considered to be "lateralized" and when involved on both sides, constitute stage II disease.
Stage III- Involvement of lymph node regions or lymphoid structures on both sides of the diaphragm. This may be subdivided stage III-1 or III-2: stage III-1 is used for patients with involvement of the spleen or splenic hilar, celiac, or portal nodes; and stage III-2 is used for patients with involvement of the paraaortic, iliac, inguinal, or mesenteric nodes.
Stage IV- Diffuse or disseminated involvement of one or more extra organs or tissue beyond that designated E, with or without associated node involvement.

MULTIPLE MYELOMA (MM)

Defition: It is a malignant proliferation of plasma cells, and then plasma Cells Produce abnormal proliferation of immunoglobulin of a single heavy and light chain. Median age : 60-70 years

Chief Complaint:

1. **Bone lytic lesions**: Tender mass lesion over skull, clavicle, Sternum, ribs Fractures, Spinal cord compression, back pain. Bone Lysis lead to hypercalcemia (Normal ALP)
2. **Bone marrow failure:** (Pancytopenia)
3. **Repeated infection:** abnormal IgG
4. **Lethargy, weakness, alter behavior**
5. **Increased paraproteins**. Hyper viscosity: Reduce cognition, Thrombotic event, bleeding
6. **Renal damage:** Nephrotic syndrome
   Light Chain cast nephropathy
7. **Neurological problems**: Peripheral neuropathy, carpal tunnel syndrome
8. For definite features remember **"CRAB"**
   Ca^{++} elevation, **R**enal insufficiency,
   Anemia, **B**one disease

Investigation:

1) **CBC / Peripheral blood smear**
   Pancytopenia, Rouleaux formation (>50%)
2) **Serum calcium**: Raised, **ALP**: normal.
3) **Serum Uric Acid**: Elevated if patient has high cell turnover or is dehydrated
4) **Serum Creatinine:** may be elevated
5) **β-2-microglobulin level:** Elevated
6) **Reversal of Albumin Globulin ratio** (AG reversal) - High Globulin
7) **Bence jones proteinuria:** Positive in some patient (24 hour urine collection)
8) **X-rays skull, Ribs**, multiple lytic lesion
9) **ESR: Raised**
10) **CT/MRI Spine** for spinal lesions.
11) **Serum protein electrophoresis (SPEP):**
    Screening test for detecting M-Protein
12) **Bone marrow study:** ↑ Plasma cells

Rx: **Date:** **Time:**

Asymptomatic, no organ damage: Follow up

If Symptomatic: then

- Bed rest and adequate fluid intake (3L/day)

For Bone pain: Analgesic

- **Inj. Ketorolac 30m (ketoroget)** IV SOS **OR**
  Tab Naproxen 500mg (Synflex) 1+1+1
- **Cap Esomeprazole 20mg (Ezomol, Nexum)**
  1+0+1 till taking painkiller OR Steroids

For Hyper-viscosity:

Plasmapheresis (to remove light chain)

For Hypercalcemia:

Hydration (IV Fluid), Steroid, Bisphosphonate

- **Inj. Zolendronic Acid 5mg/100ml (Edonax)**
  IV slowly once monthly , until response
- **Tab Prednisone 5mg (deltacortil)** 4+0+0
- **Omeprazole, vit D and calcium supplement**
- **If not improve then:** Hemodialysis

If Urate nephropathy: Allopurinol, Febuxostat

- **Tab Allopurinol 100mg (Zyloric)** 1+0+0

IF Spinal Cord Compression:

- **Tab Dexamethasone 0.5 mg (Decadron)**
  4+4+4+4 (8-16mg/day)
- Local Radiotherapy
- Vertebral collapse: vertebroplasty, kyphoplasty

Chemotherapy or treatment of Choice:

Bortezomib, Lenalidomide and moderate to high dose Dexamethasone regimen: cycle length; 21 days

- **Inj Bortezomib** 1.3 mg/m^2 SC on Day 1, 8, 15
- **Tab Lenalidomide 25mg**
  1+0+0 Daily (on days, 1 through 14)
- **Tab Dexamethasone 20 mg (Decadron)**
  2+0+0 per oral on Day 1, 8, & 15

IF kidney injury then replace Lenalidomide with
Cap Cyclophosphamide 50mg OD Day 1, 8, 15

Diagnostic criteria for MS: Simply two of the following Criteria:

1. Increased malignant plasma cells in the bone marrow
2. Serum and/or urinary M-Protein **3.** Skeletal lytic lesion

Note: Long term bisphosphonate associated with risk of Osteonecrosis of Jaw & other bony area so

- ❖ Bisphosphonate therapy is limited to 1-2years after definitive therapy in most patient
- ❖ Tell the Patient to complete any dental procedure before taking bisphosphonate And wait until its heals completely

Supportive treatment:

- **Tab Folic acid 5mg** 0+1+0 , **Cap Fluconazole 150mg (Flucon, Diflucon))** one cap weekly
- **Tab Ondansetron 8mg (onset)** 1+1+1 (if nausea /vomiting)
- **Tab Aspirin 75 mg (Loprin, Ascard)** 0+1+0

IDIOPATHIC THROMBOCYTPENIA PURPURA (ITP)

Chief Complaint:

- Easy bruising, gum bleeding, bleeding from nose without fever
- H/O respiratory tract infection: 1-3 weeks ago
- Past history : connective tissue disease, B cell malignancies, HIV
- Menstrual history: pregnant or not
- Drug history: if any

O/E: Vitals, Splenomegaly: +

- Petehiae, Purpura, ecchymosis

Investigation:

1. **CBC with PERIPEHRAL SMEAR:** Thrombocytopenia
2. **BONE MARROW EXAMINATION:** Megakaryocytosis
3. **PT and Aptt: normal, bleeding time:↑**

IVIG therapy: helpful in

1. Life threatening hemorrhage
2. Steroid refractory ITP
3. During pregnancy
4. Prior to surgery

Indication of splenectomy in ITP:

- ❖ Failure to respond to steroids
- ❖ Steroid dependent ITP
- ❖ Recurrent ITP

Rx on discharge

- **Tab prednisolone 5mg (Deltacortil)** 1mg/kg/day at morning- total 6 weeks tapering. Then 40 mg in another 6 weeks
- **Cap Nexum 40mg** OD- 12 weeks

Rx: Date: Time:

Stable patient with platelet count > 30,000

- No treatment, only observation

Patient with spontaneous bleeding:

High dose steroid first line therapy

- **Inj. Dexamethasone 4mg (Decadron)** 2 amp IV QDS--4 days (40 mg/day for 4 days)

Can also useTab prednisolone 5mg 1mg/kg/day at morning

- **Cap omeprazole 40 mg** (Risek) OD for 14 days

Patient with severe hemostatic failure (significant mucosal bleeding or slow response to steroid)

- Above (steroids) + IVIG
- **IVIG :400mg/kg/day**- 5 days, 1g/kg/day – 2 day

Persistence or potentially life threatening bleeding: Platelet transfusion

If 2 relapse or primary refractory disease:

above + spleenectomy + Rituximab or Eltrombopag

- Tab Eltrombopag 25/50 mg (1+0+0)

Can be used when steroids are contra indicated.

If above treatment fail then immunosuppressive drugs:

vincristine, cyclophosphamide, mycophenolate mofetil.

7)Other treatment:

Danazol: Elect remission, IV anti- D immunoglobulin

H. pylori & Hep C should be treated.

Stem cell transplantation: Cured some severe cases.

Platelet transfusion for surgery:

- ❖ For minor surgery : 50,000—80,000 platelet
- ❖ For major surgery: Usually: ≥100,000 Platelet

Desired Platelet count ranges:

- ❖ Prevention of spontaneous mucocutaneous bleeding : >10,000/mm3
- ❖ Insertion of central venous catheters: > 20k to 50K
- ❖ Administration of therapeutic anti-coagulation: > 30k-50k

Summary of ITP management:

- ❖ Intravenous Immunoglobulin (IVIG) in acute cases - (1 g/kg 1-2 days)
- ❖ Prednisolone - start with 1 mg/Kg 4 to 6 weeks (if no response-dose can be increased to 2 mg/kg), then slowly taper over a period of three months.
- ❖ Azathioprine, Cyclophosphamide, Danazol & Rituximab (an anti CD20 monoclonal ab) 100 mg IV weekly
- ❖ Tab. Eltrombopag 12.5 mg, 25 mg, 50 mg, 75 mg, or 100 mg: 50 mg/day AND Romiplostim

PLATLET TRANSFUSION:

- Platelet transfusions are indicated in cases of thrombocytopenia due to low production of platelet. It is not useful in immune thrombocytopenia,
- Usual dose is 1 unit/10 kg body weight. Each unit should transfuse in 5-10 minutes.
- If transfusion is delayed, shake the bag constantly to avoid platelet aggregation.
- Ideally, 1 platelet unit will raise the recipient's platelet count by 5000-1000/mm3 (Check the platelet count in 6 hours for knowing the increments) and Transfused platelets will last for 2 or 3 days.
- Prophylactic platelet transfusion is needed if <10,000/mm3.

IVIG (IV Immunoglobulin):

- IVIG and glucocorticoids together (dexamethasone 40 mg intravenously once per day for four days or methylprednisolone 1 gram intravenously once per day for three days.)
- IVIG in acute cases - (1 g/kg 1-2 days).The effect of IVIG usually persists for 2-6 weeks.
- IVIG works more rapidly (range, 1 to 3 days) than glucocorticoids (range, 2 to 14 days)
- Anti-D immune globulin (RhoGAM) is sometimes used as an alternative to conventional IVIG for patients whose blood type is RhD positive. Dose of anti-D: 75 mcg/kg IV

THROMBOTIC THROMBOCYTOPENIA PURPURA (TTP)

Definition: TTP is a thrombotic micro angiopathy caused by severely reduced activity of the vWF-cleaving protease ADAMTS13. TTP can be acquired, hereditary, inherited

Chief Complaint:

- Microangiopathic Hemolytic Anemia (Coombs negative), dark urine
- Thrombocytopenia - Purpuric rashes, Fever
- Renal Failure (Hematuria, Proteinuria, HTN)
- Delirium, seizures, neurological deficits
- Abdominal pain, nausea, vomiting/diarrhea.
- **JUST Remember:** Fever, Hemolysis (MAHA), Confusion, Low Platelet, kidney injury

O/E: Vitals, JACKLET,GCS, Skin- Purpuric rashes

Investigation:

1.ADAMTS 13 Activity(not Commonly available)

- Decrese
- Immune TTP is characterized by severe ADAMTS13 deficiency (<10%) and the presence of on inhibitor (auto anti bodies directed against ADAMTS13)

2. **Features hemolytic anemia**
   - **Blood Smear**; Anemia, thrombocytopenia Retic count fragmented cell (Schistocytes)
   - **Serum LDH**: ↑, **Direct Coombs test:** Negative
   - **Haptoglobin:** ↓, **Indirect bilirubin**:↑
3. **For Rent failure (RFT):** Proteinuria
   - **BUN, Serum creatinine**: Elevated

Rx: **Date:** **Time:**

- **Mainstay treatment: Plasmapheresis**
  1.5 Plasma volume daily If is not available or delay, then infuse Fresh frozen plasma (FFP)

Plasmapheresis: Plasmapheresis (60 to 80 ml/kg of plasma should be removed & replaced with FFP)

- ADAMTS13 can be replaced by plasma exchange
- Usually at least 5 plasma exchanges are performed in the first 10 days.
- If no response to exchange is observed, a second course of 5 exchanges can be performed.
- **For monitoring the response to plasma exchange:** advice LDH + Platelet ; once the platelet and LDH return to normal for 2 consecutive days, the treatment is tapered off slowly with monitoring for relapse
- **In patients who are refractory to plasma exchange,** cry poor plasma (or cry supernatant) have shown some response. This is fresh frozen plasma that has had the cryoprecipitate removed and is thus depleted of high-molecular weight von Willebrand multimers, which have a pathogenic role in TTP

Caution: Platelet transfusion is contraindicated in patients with TTP.

Other drugs: **Vincristine, Rituximab (RTX)**

- RTX Used in refractory and/or relapsed TTP along with Plasma exchange
- Methylprednisolone (Depo-Medrol) also use if Rituximab not available
- Splenectomy is used for relapsing disease if RTX not available or contraindicated
- N-acetylcysteine (NAC) in TTP: Experimental Studies demonstrating that (NAC) inhibits Platelet binding to endothelial Cell-secreted
- Cap Alacizumab (anti-vWF): Dose: 11mg IV at least 15 minutes prior to Plasma exchange, followed by 11mg s/c after Completion of plasma exchange on day 1 to 30.

Platelet transfusion:

- Platelet transfusions should be avoided unless life-threatening (usually central nervous system) bleeding is present. Platelet transfusions are typically not recommended for patients with TTP because they have been hypothesized to provoke fatal thrombotic events.
- Platelet transfusion may be required in patients with severe thrombocytopenia who have clinically important bleeding or who require an invasive procedure

TTP VS HUS:

PARAMETERS	TTP	HUS
Micro angiopathic hemolytic anemia	All patients	All patients
Thrombocytopenia	All patients	Most patients
Fever	75%	Usually less sever/absent
Renal failure	Mild & Absent in some patients	All patients, Severe
Neurological defects	Most patients	Less common
Age	Mostly in adults	Mostly in children

Causes of acquired TTP:

- Pregnancy, metastatic cancer chemotherapy, HIV, Anti-platelet agents
- Infection: Sepsis, auto immune diseases, vasculitis And Auto immune

ADAMTS13: Synthesized in Liver and its main function is to cleave vWF anchored on the endothelial surface in Circulation, and at the sites of vascular injury

HOMOLYTIC UREMIC SYNDROME(HUS)

Definition: HUS in an acute, fulminant disorder characterized by thrombocytopenia, microangiopathic hemolytic anemia and acute Kidney injury, usually occur in children following infection with Shiga toxin producing bacteria (E. coli 0157:H7), but may also occurs in adults

Chief Complaint:

- Fever
- Renal: Hematuria and proteinuria, Acute Renal Failure (RF)(in nearly 50%), Uremia, Hypertension
- Microangiopathic Hemolytic Anemia
- Thrombocytopenia (Despite low platelets, there is usually no Purpura or active bleeding. The degree of thrombocytopenia is unrelated to the severity of renal dysfunction) Elevated serum LDH, Normal coagulation tests.
- No neurologic abnormalities (CNS Involvement like seizures, coma, stroke, hamiparesis and cortical blindness very rarely seen, in HUS)
- Hepatomegaly with Increased SGOT/SGPT.

O/E: Vitals (Pulse, BP, Spo2%. Temp) JACKLET

Investigation:

1) **Hemolytic work up**
   - **CBC:** anemia, thrombocytopenia.
   - **LDH;** Elevated
   - **Bilirubin (indirect);** Elevated
   - **Coomb's test;** negative
   - **Peripheral smear;** Schistocytes plus helmet cell & thrombocytopenia
2) **Renal workup:** RFTS.
   - Urinalysis. Benign mild proteinuria is frequently present
   - RBCs & RBC cast may be present
3) **Stool culture:** Evaluate for E. Coli 0157: H7 and Shigella
4) **USG abdomen**: R/O causes of renal failure.
5) **Complement serology testing Factor B** (CFB) & CHSO: decrease
6) **SGPT, SGOT**

Rx: Date: Time:

In children: Self Limited; only requires Conservative management of acute Renal failure

For Hypertension: (in acute phase of illness)

- Tab Nifedipine OR Tab Nicardipine

Plasma exchange: In adults, the treatment of choice (as in TTP) is large-volume Plasmapheresis with FFP replacement (exchange of up to 80 ml/kg), repeated daily until remission is achieved.

- Plasmapheresis (60 to 80 ml/kg of plasma should be removed and replaced with transfusion of Fresh Frozen Plasma (FFP)
- contraindicated in pneumonia-induced non-Stx-HUS; may exacerbate the disease

Eculizumab (Monoclonal antibody)

Use in Patient with Complement mediated HUS, Patients with CNS involvement, Patient with other severe organ involvements

Dose: Initial dosing to treat STEC-HUS depending on body weight.

- 5 to < 10 kg: 300mg
- 10 to <40kg; 600mg
- 40 kg; 900 mg

2nd dose : at day 7 after the first dose

Dialysis: For renal failure

Rovelizumab (For treatment of a HUS in adult & Pediatric Patient aged 1 month and older.

Renal transplantation: Is safe and effective for children who progress to end-stage renal disease (ESRD)

NOTE: Renal transplantation is not an option for non-Stx-HUS because of the 50% recurrence rate and >90% rate of graft failure in patients with recurrence

NEPHROLOGY

Urinary tract infection (UTI)

Definition: Infection in any part of the urinary tract, Subdivided into upper & lower tract infection
Lower tract infection; urethritis (Dysuria), Cystitis (increase urinary frequency and urgency)
Upper tract infection; Acute pyelonephritis (WBC, RBC Cast), prostatitis, intrarenal/Perinephric abscess.

Chief Complaint:

- Fever, chills, rigors, vomiting
- Dysuria (Burning micturition)
- Increase urinary frequency and urgency
- Hematuria (Structural deformity)
- Lower abdominal pain, low back ache, Flank pain
- Perineal pain (prostatitis in men)
- Diabetic patient ; minimal symptoms

Past HX: Diabetes
Drug Hx: Steroids or immunosuppressive drug

O/E:

- Vitals (pulse, BP, SPO2%, Temp, RR) JACKLET
- Abdomen: Costovertebral angle tenderness Suprapubic tenderness

Investigation:

1. **Urine R/E**
2. **Ultrasound Abdominopelvic "KUB"** (Stones, malignancy, Prostitis)
3. **Urine for C/S** (If recurrent UTI)
4. **CBC and blood culture** (in Septicemia)
5. **RFTS, Serum electrolyte**

UNCOMPLICATED UTI:

✓ Normal tract structure & function

COMPLICATED UTI:

✓ UTI arising in a setting of catheterization, instrumentation, Structural & functional abnormalities, Stones, obstruction, BPH, catheter, neurogenic bladder, immunocompromised (diabetes, drug)
✓ Typically due to hospital acquired bacteria

Rx: Date: Time:

- **Diet:** Increase fluid intake
- **Tab Ciprofloxacin 500mg (Ciproxin, Novidat)** 1+0+1 for 5 days
- **Na Acid citrate (Syp Citralka, Fedralka)** 2tsf + 2tsf + 2tsf dissolve in a glass of water
- **Cran-Max or Cran berry sachet** 1 sachet in a glass of water BD
- **Tab Diclofenac Na 100mg (Voltral SR)** 1+1+1
- **Tab Mebeverine 135 mg (Zeespa)** 1+1+1 (if having spasmodic pain)
- **Correction of Sodium if needed**

UTI IN PREGNANCY:

- **Tab Nitrofurantoin 100mg (Uriston)** 1+0+1 for 5 days **OR**
  Tab C0-Amoxiclav (Augmentin, Calamox) 625mg 1+1+1 for 5 days **OR**
  Tab Azithromycin 500mg (Azitma, Zygrel) 1+0+0 before breakfast for 6 days
- **Tab Panadol 500mg (Panadol, Calpol)** 1+0+1 (for pain & fever)
- **Cran-Max or Cran berry sachet** and Syrup Fedralka or Citralka are also safe

Complicated UTI:

- For complicated UTI treatment for at least 4-21 days
- Follow up culture 2-4 weeks after cessation of therapy to demonstrate cure
- All Male UTI must be treated as Complicated UTIs (minimum 14 days)

Chronic/Recurrent UTI: Antibiotic Prophylaxis:

Continuous daily prophylaxis with 1 of the following for 6 weeks

Tab TMP+SMX DS (Septron DS) OD
Tab Nitrofurantoin 100mg (Furadantin) OD
Tab Norfloxacin 400 mg OD
Tab Cephalexin 250mg OD
Fosfomycin (Focin Ultra) 3 mg Every 7-10 days

Types of UTI	Empiric (Antibiotic) therapy
Cystitis (uncomplicated)	**Tab Nitrofurantoin 100mg (Furadantin, Uriston)** BD for 5 days **OR** **Tab TMP+SMX DS (Septron DS)** BD for 7 days. **OR** **Fosfomycin (Focin Ultra) 3 mg** single dose oral sachet **Other:** **Tab Norfloxacin 400 mg (Noroxin)** BD for 7 days **OR** **Tab Ciprofloxacin 500 mg (Cipval, Novidat)** BD for 7 days. **OR** **Tab Ofloxacin 200 mg (Oflox, Oflobid)** BD for 7 days **OR** **Tab Pivmecillinam 200 mg (Selexid)** BD 5 days.
Pyelonephritis	Injectable: **Inj. Ampicillin (Amplus) 1gm** IV QID (After test dose) Plus one of **Inj. Ceftriaxone 1gm (Oxidil, Rocephin)** IV BD (After test dose) **OR** **Inj. Gentamicin (Gentic) 1mg/kg** IV TDS **OR** **Inf. Ciprofloxacin 4000mg (Novidat, Cipval) IV BD** **After injectable give Oral antibiotics for 14 days** Oral Antibiotic: **Tab TMP+SMX DS (Septran DS)** 160/800 mg BD for 7 days. **OR** **Tab Levofloxacin 750 mg (Leflox)** OD for 7 days **OR** **Tab Cefpodoxime 200mg (Cefprox)** BD orally for 7 days **OR** **Tab Cefexime 400 mg (Cefiget)** BD for 10 days
Pregnancy	**Cap Amoxicillin 500 mg (Amoxil)** TDS 5-7 days **OR** **Cap Co-Amoxiclave 625mg (Augmentin, Calamox)** TDS 5-7 days **OR** **Cap Cephalexin 500 mg (Keflex)** BD for 5-7 days **OR** **Tab Cefexime 400 mg (Cefiget)** BD for 5 or 10 days **OR** **Tab Nitrofurantoin 100mg (Uriston, Furadantin) BD** for 5 days **OR** **Tab Azithromycin 500 mg (Azitma, Zygrel)** OD for 6 days
Complicated UTI	**Fosfomycin (Focin Ultra) sachet** oral 3 g every 2 to 3 days for 3 doses **Inj. Ampicillin 1gm (Amplus)** IV QDS (After test dose) **PLUS** **Inj. Gentamycin (Gentic)** 1mg/kg 8th hourly or TDS **OR** **Inj. Ampicillin + Sulbactam 1.5 gm** IV QID **Inj. Ceftriaxone (Oxidil, Rocephin)** 1-2 gm IV BD **OR** **Inj. Piperacillin + Tazobactam** 3.375 gm TDS **Inj. Meropenem (Meronem) 1 gm** IV TDS
Prostitis (acute)	Injectable: Ampicillin+ Gentamycin **OR** Ceftriaxone+ gentamycin / Amikacin **Inj. Ampicillin (Amplus) 1gm** IV QID (After test dose) **Plus** **Inj. Gentamicin (Gentic) 1mg/kg** IV TDS ; When Fever resolves switch to oral **Tab ciprofloxacin 500 mg (Cipval, Novidat)** BD for 3 weeks **OR** **Tab TMP+SMX DS (Septron DS)** BD for 3 weeks days **FOR Chronic Prostitis: Tab Ciprofloxacin 500 mg (Cipval, Novidat)** BD **OR** **Tab Levofloxacin 750 mg (Leflox)** OD **OR** **Cap Doxycycline (Vibramycin) 100mg BD** for 1-3 months
Chronic Prostitis	**Tab ciprofloxacin 500 mg (Cipval, Novidat)** BD **OR** **Tab Levofloxacin 750 mg (Leflox)** OD **OR** **Cap Doxycycline 100mg (Vibramycin)** BD for 1-3 months

Urge incontinence (Overactive bladder)

Chief Complaint:

- Increase urinary frequency, Overwhelming desire to void large loss, nocturia, Precipitated by Stress

Investigation: Urine R/E, USG Abdomen (KUB)

Differential diagnosis:

- **Idiopathic**
- **Neurological problems:** Diabetes, spinal cord injury, dementia, PD, multiple sclerosis
- **Local irritation**: Bladder stones, cancer, UTI
- **Obstruction:** Bening prosthretic hyperplasia
- **Surgery:** Transurethral resection of prostate (TURP)

Rx: **Date:** **Time:**

Advice:

- ✓ Life style modification
- ✓ Decrease fluid intake
- ✓ Avoid irritant: black coffee, tea, cold drinks etc.
- ✓ Bladder training: Resist the urge to pass urine for maximum period
- ✓ Start with an achievable interval based on diary evidence and increase slowly -continue for >weeks
  - **Tab Mirabegron 25mg (Mirabet)** 1+0+0 **OR**
  - **Tab Oxybutynin 5mg (Butyn)** 1+0+0 continue

ACUTE KIDNEY INJURY (AKI)

Definition: AKI is defined as rapid , usually reversible loss of renal function (decline in GFR) measured as by increase in Creatinine & Blood urea nitrogen (BUN) and usually accompanied by reduction in urine volume (oliguria, Anuria)

Chief Complaint:

- Azotemia (Increase of blood urea and creatinine)
- Uremia (a state where azotemia associated with clinical signs & symptoms) Nausea, vomiting, malaise
- Scanty or complete cessation of micturition
- Drowsiness, fits and coma.
- History of vomiting, diarrhea burn, hemorrhage Drug Hx: Diuretic, ACEI, ARBs, NSAIDs, PPI, penicillin, calcineurin inhibitors, iodinated contrast, aminoglycoside, methotrexate, IV drug abuse

O/E: Vitals, JACKLET

- JVP, Abdominal examination

Investigation:

1) **Serum creatinine :** Raised
2) **Serum electrolyte :** hypo or hyper kalemia
3) 24 hours urine output initially low but increased in recovery phase
4) **Urea (or BUN):** highly elevated
5) **Serum phosphate**; elevated
6) **CBC:** WBC increase in infection
7) **Serum Na;** Hyponatremia (in oliguric AKF)
8) serum Ca hypocalcemia (common)
9) Urine R/E RBC or RBC cast
10) ECG (tented T wave, increase PR interval, small wave pattern, asystole)

Monitor: RBS hourly up to 6 hours of infusion.

Date: **Time:**

- **Diet**: Salt intake 1- 2 gm/day
- Protein restriction 0.6 gm/kg/day (40 gm /day)
- Catheterize the patient (Input output record)

(A) In volume depleted patients (hypovolemic)
(decrease BP, increase pulse, decrease urine output, non-visible JVP): then

- Inf. NS 1L IV @ 40 drops /min (150 ml /hour) then 500 ml after clinical review

(B) Volume Overload (or fluid overload)
(increase BP, increase JVP, lung crepts, gallop rhythm, Edema)

- **Inj. Furosemide (Lasix) 40mg** IV stat and BD Maintain fluid intake to the volume of urine output plus 400 to 500 ml (usually <1L/day)

(C) Once Euvolemic; Inf N/S IV @ 20 drops /min

(D) if infection suspected (or WBC raised)

- **Inj. Ceftriaxone 1g (Oxidil, Rocephin)** (ATD) 1 vial IV stat and then BD

(E) if PH less than 7;

- **Inj Sodium bicarbonate 7.5 mg** 1/2 amp IV slowly stat

(G) If hyperkalemia see electrolyte management portion

Note: maintain input output chart
Stop any offending drug (ARBS, NSAIDS, etc)
Find and treat the underlying cause.

KDIGO (kidney disease: improving global outcome) classification of kidney failure:

Criteria for the definition of kidney diseases and disorders.

	Functional criteria	Structural criteria
AKI	Increase in Serum creatinine by 50% within 7 days, or increase in Serum creatinine by 0.3 mg/dL within 2 days, or oliguria	No criteria
CKD	GFR <60 ml/min for >3 months.	Kidney damage for > 3 months
AKD	AKI or GFR < 60 ml/min/1.73m2 for < 3 months , or decrease in GFR ≥35% or increase in Serum creatinine by >50% for <3 months	Kidney damage for <3 months
NKD	GFR ≥ 60 ml/min 1.73 m2 , stable Serum creatinine	No damage

Abbreviations AKD, acute kidney disease and disorders: AKI, acute kidney injury or impairment: CKD, chronic kidney disease: GFR, glomerular filtration rate: NKD, no know kidney disease or disorders

RIFLE (risk, injury, failure, loss and end stage renal disease) classification of ARF:

RIFLE Category	GFR criteria	Urine output criteria
Risk	Serum creatinine increase by 1.5 times of baseline.	0.5 ml/kg/hr for 6 hours
Injury	Serum creatinine increase by 2 times of baseline.	0.5 ml/kg/hr for 12 hours
Failure	Serum creatinine increase by 3 times of baseline OR serum creatinine > 4mg/dl and acute increase > 0.5 mg/dl from baseline.	0.3 ml/kg/hr for 24 hours or anuria for 12 hours
Loss	Complete loss of kidney function for > 4 week	
End stage renal disease	Need for renal replacement therapy for > 1 months	

Indication of call or referral to nephrology ward

- ✓ AKI not responding to treatment
- ✓ AKI with complication (increase K, fluid overload, acidosis)
- ✓ Stage 3 AKI OR AKI with hypertension
- ✓ AKI due to possible intrinsic renal disease
- ✓ AKI with difficult fluid balance e.g pregnancy, heart failure, by hypoalbuminemia

Stages: It can be divided into 3 stages

- ✓ **Initiating Stage** Features of the inciting factor.
- ✓ **Maintain Stage** Oliguria (40 to 400 ml urine per day), progressive rise of blood Urea and creatinine hyperkalemia, metabolic acidosis, with Salt and water overloaded.
- ✓ **Recovery stage,** gradual increase in urine volume (may be 3 liter per day (Sign of recovery. urea & creatinine begin to return to normal There is increase vulnerability to infection.

CHRONIC KIDNEY DISEASE (CKD)

Chief Complaint:

- Decrease or no urine , fluid overload
- Anorexia, Nausea, vomiting, weakness
- Hiccup, drowsiness
- Shortness of breath, Pruritus, anemia

O/E:

- Vitals (pulse, BP, SPO2%, Temp, RR) JACKLET
- Hypertension Anemia: +, Edema: +, JVP
- Systemic examination, starch mark on skin

Investigation:

1) **Urine R/E** (Proteinuria. Hematuria)
2) **Serum electrolyte** (Hyperkalemia)
3) **Blood Urea and Creatinine** (Raised)
4) **CBC;** Anemia "Normocytic normochromic"
5) **Serum Calcium and Phosphate**
6) **USG Abdomen:** KUB & Prostate
7) **ECG & ECHO:** (for heart failure)
8) **RBS, Fasting lipid profile, Serum PTH level**
9) **Serum Ferritin:** Before giving Erythropoietin

If Dialysis is planed: HBsAg, AntiHCV, AntiHIV

Indication of Dialysis:

- Intractable Pulmonary edema
- Persistence hyperkalemia ($K^+ > 7$) and severe metabolic acidosis not responding to medical treatment
- Uremic Pericarditis
- Uremic encephalopathy
- Hypophosphatemia despite TX (Binder)
- Intractable Anemia despite EPO & Iron

Criteria for referral to nephrology ward:

- eGFR < 30ml/min
- Rapid deterioration in renal function
- Significant proteinuria
- Hypertension that poorly controlled with despite at least 4 anti-Hypertensive medications
- Renal involvement in multisystem disease

Rx: Date: Time:

Diet: Fluid, fruits, K^+ containing food & protein restriction (protein 60mg/day), stop smoking,
Avoid nephrotoxic drug (e.g NSAID, Herbal medication, Homeopathic medication)

For fluid Overload:

- **Inj. Furosemide 20mg (Lasix)**
  20-120mg IV (monitor BP); in hospital or clinic
- **Tab Furosemide (Lasix) 40mg**
  1+1+0 after meal

For hypertension and Proteinuria:

(ACEI, ARBs, OR Calcium channel blockers)

- **Tab losartan potassium 50mg (Losanta)**
  0+0+1

For Anemia(if other causes of anemia excludes)

- **Tab iron + folic acid (Bisleri F, Ibert folic F)**
  0+0+1
- **Inj. Recombinant Human Erythropoietin 2000 IU/4000IU (Espogen)**
  DOSE: Initially 50-100 units/kg SC 3 times a week and then adjust according to response
- For bleeding or tendency of bleeding:
  Fresh Frozen plasma (FFPs)

For Hyperkalemia:

- **Inj. Calcium gluconate 10%** 10 ml IV Over 10 min. the dose can be repeated If any change in ECG is seen after 5-10 minutes
- **Inj. Insulin R 10 Units + Inf 25% Dextrose 50-100 ml IV Slowly**
- **Inj. Furosemide 20mg (Lasix)** 80-100mg IV
- **If not recover: Advice Hemodialysis**

Other medication for CKD: Also add:

- **Tab Rosuvastatin 10mg (Rast)**
  0+0+1 (for hyperlipidemia)
- **Tab Calcium Acetate 667mg (Lophas)**
  1+1+1 (monitor Calcium regularly)
- **Tab Sevelamer HCL 400mg (Neosev)**
  1+1+1 (prescribe it when Ca^{++} is high)
- **Tab Alfacalcidol 0.5mcg (Hancidol)**
  1+0+1

Treatment of underlying Cause

RENEL TUBULAR ACIDOSIS (RTA)

Definition: RTA is a condition that involves an accumulation of Acid in the body due to a failure of the kidneys to appropriately acidify the urine. The defect is either inability to excrete H+ (inadequate generation of HCO3 -) or in appropriate reabsorption of $HCO3^-$

Characterized by:

- Hyperchloremia acidosis
- Normal anion gap Acidosis
- High urine PH (>5.5 in the presence of systemic Acidosis)

Chief Complaint:

- Mostly asymptomatic
- Features of electrolyte imbalance or progress to chronic kidney disease

Suspect when there is metabolic Acidosis (PH, HC03-) and normal anion gap

TYPE1 RTA

❖ Associated features - hypokalemia, hypocitraturia, Hypercalciuria, nephrocalcinosis, and/or nephrolithiasis. Chronic untreated acidosis may cause rickets or osteomalacia.

Lab investigation

- **S-electrolyte, urine R/E**
- **Plasma HCO3:** <10 mEq/L
- **Urine pH**: > 5.5 & **Serum K^+:** Low

TYPE2 RTA

❖ Associated features - hyperphosphaturia, hyperuricosuria, hypercalciuria, nonselective amino aciduria and glycosuria. In addition to hyperchloremic acidosis, rickets or osteomalacia are the predominant effects of Fanconi syndrome.
❖ Congenital, e.g. Fanconi's syndrome, cystinosis, Wilson's disease
❖ Paraproteinemia, e.g. myeloma
❖ Amyloidosis/ Hyperparathyroidism
❖ Heavy metal toxicity, e.g. Pb, Cd, Hg
❖ Drugs, e.g. carbonic anhydrase inhibitors

Investigation

- ABG, Serum electrolyte, urine R/E
- Plasma $HCO3^{--}$: 15-20mEq/L
- Urine pH <5.5, Serum K^+: low

TYPE3 Mixed

❖ Inherited: mutation in carbonic anhydras, II. Characterized by a clinical syndrome known as Guibaud-Vainsel syndrome or marble brain disease, with osteopetrosis, RTA of mixed type, cerebral calcification, and mental retardation. Other clinical features include bone fractures (due to increased bone fragility) and growth failure. Excessive facial bone growth leads to facial dysmorphism and conductive hearing loss and blindness due to nerve compression

TYPE4 RTA

- Associated features: Renal salt wasting is frequently present
- Examples:
- Hypoaldosteronism (primary or secondary)
- Obstructive nephropathy
- Drugs, e.g. Spironolactone, Amiloride, ACE inhibitors
- Renal transplant rejection
- **Investigation** (ABG, urine R/E, S. electrolyte
- plasma HCO3- 16-22 mEq/L
- urine PH < 5.5, serum k+ - High

Time: **Date:**

Rx:

Distal RTA (Type 1 RTA)

- Tab NaHCO3 (Sodamint) (1-2 mEq/kg/day)
- Correct primary cause

Proximal RTA (Type 2 RTA)

- Tab NaHCO3 (Sodamint) (10-15 mEq/Kg/day)

Type 4 RTA

- Diet: Dietary Potassium restriction (40-60 mEq/day)
- Tab NaHCO3 (Sodamint) 2+2+2 (1-2 mEq/kg/day)
- Na+ Polystyrene Sulfonate
- Tab Fludrocortisone (50-200mcg daily)

Emergency Medicine

HYPOVOLEMIA

Chief complaint:

1. **Due to volume depletion:**
- Thirst, fatigue, weakness, muscle cramps.
- Postural dizziness, confusion, coma.
- Oliguria, concentrate urine.

2. **Due to fluid loss** (vomiting, diarrhea polyuria, a severe skin burns or condition with 3rd space volume loss.)

3. **Due to electrolyte and acid base disorder:**
- Muscle weakness (Hypokalemia).
- Tachypnea (Acidosis).
- Lethargy, confusion, seizures and coma due to Hyponatremia or hypernatremia.

O/E: Vital (BP, pulse, SPO2%, Temp) GCS

1. **Decrease capillary refill time (CRT)**
(Normal CRT < 2 seconds)
2. **Passive leg raising (PLR) Test.**
- Make sit patient at 45 degrees head up Semi-recumbent position
- Lower patients' upper body to horizontal and passively raise legs at 45 degrees up.
- Maximal effect occurs at 30-90 seconds
- Access for a 10% increase in stroke volume or using a surrogate such as pulse pressure causing an arterial line)
- 9% ↑in stroke volume; 86 % sensitivity, 90 % specify.
- 10 % ↑ in Pulse pressure; 79 % sensitivity, 85 % specificity.
- If Pulse pressure increase on PLR Test patient BP can be ↑ with IV fluids (patient may respond to fluid)

3. **IVC diameter < 2cm:** Great predictor of low central venous pressure (CVP). If IVC on VSG is collapsed patient is having fluid overload.
This a good tool to know fluid status of patient.

Investigation: RBS, ECG

1) **BUN elevated:** due to pre-renal azotemia.
2) **Serum creatinine** may be elevated
3) **Serum sodium**
- ✓ **Low;** if both sodium & water loss
- ✓ **High;** id water loss exceeds sodium loss

Rx: **Date:** **Time:**

- **Bed rest**

Mild case; oral fluid, ORS

Composition of ORS:

Sodium chloride	2.6 g
Glucose (anhydrous)	13.5g
Potassium chloride	1.5g

- ✓ Tri NA^+ citrate dehydrate – 2.9 g
(Total weight of a pocket =20.5 g)
- ✓ Dissolve entire content of the pack in IL of clean drinking water.
Used within 24 hours.
- ✓ Made fresh solution daily.

Shouldn't be boiled or sterilized.

If sodium is low:

Inf NS 0.9% IL IV @ 20drops/min
Repeat if needed.

If sodium is high

Correct with half NS (0.45% NACL) or 5 % dextrose
- **Inf. NS 2L** IV @ 30 mL/kg (1-2L) over 30 - 60 minute
- **End point MAP** ≥ 65.
- Use NS or RL instead of albumin solution
- Pass catheter
- Input, output record
- Normal saline is more effective in expanding plasma volume
- 5 % dextrose is no effective solution.

Selection of fluid

Condition	IV Fluid
Hypovolemic Shock	NS, RL
Diarrhea	NS, RL
Vomiting	NS, Isolate G
Starvation	5 % Dextrose
Burns	RL (Ringers lactate)
DKA	NS (Normal Saline)
HHS	Half NS

SHOCK

Definition: A State of cellular & tissue hypoxia due to Consumption of demand, inadequate oxygen delivery and/or increased oxygen consumption or inadequate oxygen utilization.

Hypovolemic Shock:

- **Hemorrhagic:** (Trauma, Bleeding, surgery)
- **GIT losses:** (diarrhea, vomiting, external drainage)
- **Skin losses** (heat stroke, burns, severe dermatologic conditions including Stevens-Johnson syndrome)
- **Renal losses** (excessive drug-induced or osmotic diuresis, salt-wasting nephropathies, hypoaldosteronism)
- **Third space losses** into the extravascular space or body cavities (postoperative and trauma, intestinal obstruction, crush injury. pancreatitis, cirrhosis)
- **PCWP (Preload) = ↓,** SVR(after load) = ↑
- Cardiac output (CO) = ↑

Distributive shock:

- **Distributive shock** is characterized by severe peripheral vasodilatation (vasodilatory shock). Distributive shock occurs primarily as septic shock or anaphylactic shock.
- **Neurogenic shock;** Hypotension and shock are common in patients with traumatic brain and spinal cord injury.
- **Endocrine shock;** Adrenal failure due to mineralocorticoid deficiency and myxedema can lead to hypotension, shock.
- Abdominal compartment syndrome (ACS)
- Anaphylactic shock
- PCWP (preload) = ↑, **SVR(after load) = ↓**
- Cardiac output (CO) = ↑,

Obstructive Shock:

- **Pulmonary vascular:** most cases of obstructive shock due to right ventricular failure 2ndry to massive pulmonary embolism (PE) or severe pulmonary HTN
- Tension pneumothorax
- Pericardial tamponade
- Constrictive pericarditis
- Restrictive cardiomyopathy

Cardiogenic shock:

- Severe depression of cardiac index [<2.2 (L/min)/²] and sustained systolic arterial hypotension [<50mmHg) despite an elevated filling pressure (PCWP >18) so
- PCWP (preload) = ↑, SVR(after load) = ↑
- **Cardiac output (CO) = ↓**

Causes:

- Acute severe MI, Severe aortic or mitral regurgitation, rupture of interventricular Septum, myocarditis, acute massive PE, Cardiac tamponade

Tretament:

Inotropes, Revasularization

Shock Index (SI) in hypovolemic Shock:

Heart rate (HR) divided by systolic blood pressure (SBP). It has been suggested as such a marker that can be used to predict the severity of hypovolemic shock. SI >1.0 has been widely found to predict increased risk of mortality and No shock is a SI of <0.6, Mild shock 20.6 to <1.0, Moderate shock 21.0 to <1.4, Severe shock 21.4

Sympathomimetic agents:

DRUG	RECEPTOR TYPE				ACTIONS			
	α	β-1	β-2	Dopamine	Cardiac stimulation	Vaso Constriction	Vaso dilation	Cardiac output
Dobutamine	+	++++	++	0	++++	+	++	↑
Dopamine	++	++++	++	++++	5-10 mcg	> 10mcg	0.5-5mcg	↑
Epinephrine	+++	++++	+++	0	++++	++++	++	↑
Norepinephrine	++++	++++	0	0	++	++++	0	nil
Phenylephrine	+++	0	0	0	0	++++	0	↓

Shock..Continue

C/F & examination:

- Hypotension - Systolic BP <100mmHg mmHg/postural hypotension
- Tachycardia > 100 beats/min
- Cold, clammy skin
- Tachypnea (>20 breaths/min), Rapid shallow breathing
- Drowsiness, confusion, irritability
- Oliguria (Urine output < 30 ml/hour)
- Reduced or Elevated JVP/Central venous pressure
- Multi organ failure (Liver failure, Renal failure, ARDS, Encephalopathy)
- Poor or altered cerebral function, Hypoxemia, Hypothermia

Investigation

1) **CBC, RBS, RFTS, LFTS**
2) PT, INR, aPTT, Serum fibrinogen
3) Serum electrolyte: hypernatremia, hyperkalemia due to RF, low urinary Na Concentrate, or fractional excretion of Na <1% may indicate hypovolemia
4) **D-dimer** (if suspect DIC)
5) ECG, Echo. CXR, ABG – Acidosis

Treatment of Hemorrhagic shock:

A) Blood loss < 750ml : Observe
B) Blood loss 750-1500ml: Fluid therapy
C) Blood loss 1500-2000ml: fluid therapy + blood transfusion if HB% <7gm
D) Blood >2000ml: shock : blood transfusion

Steroids in Shock(septic):

It is definitely indicated in adrenal insufficiency (sepsis, TB adrenalitis, Meningococcal infections): start hydrocortisone, 50 mg every 6 hour, & tapered as the patient achieves hemodynamic stability (or 7 days) + Fludrocortisone 50mg/day

Rx: **Date:** **Time:**

- Bed rest: Passive leg raising
- Make sit patient at 45 degrees head up semi-recumbent position,
- lower patient's upper body to horizontal and passively raise legs at 45 degrees up, maximal effect occurs at 30-90 seconds
- Assess for a 10% increase in stroke volume (cardiac output monitor) or using a surrogate such as pulse pressure (using an arterial line)
- 9% increase in stroke volume has 86% sensitivity and 90% specificity
- 10% increase in pulse pressure has 79% sensitivity and 85% specificity
- if patients pulse pressure increases on PLR test patients BP can be increased with IV fluids (patient may be respond to fluid)
- O2 inhalation stat & SOS
- **Inf NS (30ml/kg)** IV @15 drops/min - Continue until BP and tissue perfusion are acceptable, pulmonary edema or intraabdominal HTN ensues or fluid fail to augment perfusion
- **Vasopressor**: Used when aggressive fluid resuscitation has failed to restore adequate tissue perfusion.
- **Inj. Dopamine** 200mg /5ml + inf NS 500ml IV @ 25 micro drops/min
  -**Noradrenaline:** 0.05-5mg/kg/min infusion
  -**Dobutamine:** 5-20mg|kg/min infusion
  -**Dopamine:** 5-20mg/kg/min infusion

keep MAP (mean arterial pressure) ≥ 65

Other drug

Glucagon in shock: Patients on beta blockers in refractory hypotension: inj glucagon 1 mg every 5 minutes IV till hypotension resolves, followed by 50 mcg/kg IV every minute, then 5-15 mcg/min infusion

SEPSIS

Definition: It is a clinical syndrome characterized by systemic inflammation due to infection, immune dysregulation, microcirculatory derangements and end-organ dysfunction.

Chief Complaint:

Red flag Findings:

- Presence of fever (core temp > 38.3 °C (101°F) for patients 3 months of age and older or > 38 °C (100.4 °F) for infant < 3 months of age.
- Hypothermia (Core temp < 36 °C (96.8°F)
- Tachycardia
- Tachypnea
- Abnormal pulse (diminished , weak or bounding)
- Abnormal capillary refill (central refill ≥ 3 seconds or flash refill < 1 second
- Hypotensive
- Abnormal mental status: irritability, inappropriate crying, inappropriate downiness(e.g Excessive per caregiver) not interacting with caregiver, Difficult to arouse (lethargic or obtunded), Confused (not oriented to person, place or time when developmentally appropriate to test)
- Purpura anywhere on the body or Petehiae below the nipple line
- Macular erythema

On examination:

- Vitals: (Pulse, BP, Spo2%, Temp)

Investigation:

1) CBC with ESR, CRP
2) Blood culture
3) Urine R/E
4) LFTS, RFTS, RBS, Serum Electrolyte.
5) Serum lactate.

Sepsis markers;

1) Increase TLC
2) Increase CRP

Rx: **Date:** **Time:**

Empiric Antibiotic Therapy (1st hour)

- Pseudomonas – Alternatively, if pseudomonas is likely a pathogen, we favor combining Vancomycin with two of the following, depending on local antibiotic susceptibility patterns :
  - ➢ Antipseudomonal cephalosporin (e.g, ceftazidime, cefepime), **or**
  - ➢ Antipseudomonal carbapenem (e.g, Imepenem, Meropenem), **or**
  - ➢ Antipseudomonal beta-lactam/beta-lactamase inhibitor (e.g, piperacillin tazobactam, ticarcillin-clavulanate **or**
  - ➢ Fluroquinolones with good anti-pseudomonal activity (e.g, ciprofloxacin), Aminoglycoside (e.g, gentamicin, Amikacin), **or**
  - ➢ Monobactam (e.g, aztreonam)

Target:

- ➢ Urine output ≥ 0.5 mL/kg/hour
- ➢ CVP at a target of 8 to 12 mmHg
- ➢ Target a MAP ≥65 mmHg
- ➢ Central venous oxygen saturation: SV02 ≥70 %
- ➢ Serum lactate (e.g, every six hours): The lactate clearance is defined by the equation [(initial lactate - lactate >2 hours later)/initial lactate] x 100. 10% decrease in lactate clearance after 2 hours is good sign of tissue reperfusion.

SEPTIC SHOCK

Definition: Clinical construct of sepsis with persisting hypotension requiring vasopressors to maintain MAP ≥ 65 mm hg and having a serum lactate level > 2 mmol/L (18mg/dL) despite adequate volume resuscitation (≥ 30 ml/ kg of saline in one hour).

Chief Complaint:

Sepsis accompanied by Cardiovascular dysfunction as demonstrated by the presence of any one of the following criteria.

- Hypotension
- Reliance on vasoactive drug administration to maintain a normal BP.
- Two or more of the following signs of inadequate tissue perfusion
  1. Prolong capillary refill
  2. Oliguria, metabolic acidosis.
  3. Elevated blood lactate.

Sings & Symptoms of Infection:

- Rigors, seizures, meningismus
- Respiratory depression or failure
- Macular erythema (toxic shock syndrome).
- Skin cellulitis, lymphangitis, or abscess.
- Peripheral edema caused by capillary leak.

O/E:

- Vitals (Pulse, BP, Spo2%, Temp)
- BP: Hypotension, Temp: Fever > 38.3 °C
- Toxic, or ill appearance, signs of dehydration.
- Pulmonary rales or decrease breath sound caused by bronchopneumonia.
- Distended, tender abdomen (e. g perforated virus or intraabdominal abscess.
- Ecthyma associated with pseudomonas infection
- Purpura associated with Neisseria meningitidis

Investigation:

1) **CBC;** Increase total leukocyte count
2) **ESR, CRP;** increase
3) Urine R/E
4) LFTS, RFTS, RBS, Serum Electrolyte.
5) **Serum lactate;** increase

Rx: Date: Time:

- **Bed Rest:** change posture 2 hourly, physiotherapy
- **Maintain ABC** (Airway, Breathing, Circulation)
- **Inj. NS 3L IV** @ 250drops/minute
  2 TO 3 L In First three hours.
- **Inj. Hydrocortisone 250mg (Hyzonate)**
  IV stat & BD
- **Inj. Meropenem 1 g (Meronem)**
  1 vial IV stat & TDS **OR**
  Inj. Ceftriaxone 2gm (Oxidil, Rocephin)
  1 vial IV stat & BD (After test dose)
- **Inj. Norepinephrine 2 mg/2ml (norphine)**
  2 ampule + 500 ml NS IV @ 8-10drops/minute
  Dose: 0.1 to 1 mcg/kg/min IV
  If still no proper or good response to fluid and norphine (vasopressor) then we can also add
  Inj. Dobutamine 200mg/5ml
  2 amp + 500ml NS IV @ 8-10 drops/ minute

Treatment of Catecholamine resistance hypotension:

Synthetic human Angiotensin II (Ag II)

Initial; 20 ng/kg/min IV by continuous infusion

1) Titration; monitor BP response and titer every 5 min by increments up to 15ng /kg/min to achieve or maintain target BP, not exceed 80 ng/kg/min in 1st 3 hour of treatment

2) Maintenance; shouldn't exceed 40 ng /kg/min; dose as low as 1.25 ng/kg/min may be used.

3) Once shock improved, titrate every 5-15 mins by increments of up to 15 ng/kg/min based on BP

4) Administration via CV line is recommended

Target:

- ✓ **Mean Arterial pressure (MAP)** ≥ 65
- ✓ **Urine output** ≥ 0.5 ml/kg/hour
- ✓ **CVP** 8 to 12 mm hg, **SP02 %** SCV 02 ≥ 70%
- ✓ **Focus identification and source control**

ANAPHYLAXIS/ANAPHYLATIC SHOCK

Anaphylaxis is a life-threatening condition caused by systemic allergic reaction to some external agents. Anaphylaxis response of a sensitized pattern appears within minutes after administration of specific antigen and is manifested by respiratory distress often followed by shock "Anaphylactic shock

Chief Complaint:

- Skin: Pruritus & urticaria with or without angioedema
- Stridor, wheeze, bronchoconstriction, laryngeal obstruction
- Lips-angioedema, Flushing, sweating
- Conjunctival injection-redness
- Nausea, vomiting, diarrhea, abdominal pain
- Hypotension, shock, loss of consciousness

Hx: Hx of insect bite, taking allergic food or drug

On Examination:

Vitals (Pulse, Bp. Spo2% Temp), cyanosis
wheeze +, hypotension, shock, tachypnea, urticarial rash

Investigation:

1) RBS, CBC, Serum electrolytes
2) RFTs, LFTs
3) ECG

Causes:

1. Drug: Antibiotic especially penicillin, B-lactam, NSAIDS, Anesthetic agents
2. Food items: peanuts, shellfish, egg, milk, soya,
3. Inset stings: Bee, wasp
4) Diagnostic testing substances, and other allergens as well as idiopathic anaphylaxis or exercise induce anaphylaxis

Note:

Intra-muscular route of adrenaline is preferable but if patient not improved immediately after IM adrenalin injection, then we have to give infusion protocol

Rx: **Date:** **Time:**

- **Maintains in ABC** (airway, breathing, Circulation)
- Bed rest
- **If Stridor's present:** Refer to ENT for tracheostomy
- **Supine or Trendelenburg's position**
- **Pass IV line**
- **O2 inhalation stat & SOS**
- **Inj. Hydrocortisone (Hyzonate)** 250mg IV stat
- **Inj. Pheniramine maleate (Avil)** 1amp IV Stat **OR**
  Inj. Pheniramine maleate10mg (Avil)
  10-20mg IM or IV Slowly
- **Inj. Adrenaline 1mg/1ml** (1:1000 solution)

0.3 to 0.5ml IM stat, repeated at 5 min interval if response is not adequate. the site may be gently massage to facilitate absorption

- **Inj. Omeprazole 40 mg (Risek, Ruling)**
  1 vial stat and OD
- **Nebulization with Adrenaline**
  Stat & SOS (if breathing difficulty)
- **Inf NS IV** @ 30 drops/min – continue

Anaphylaxis due to Beta blocker

Anaphylaxis in a patient who is on B-blocker is a special problem because of refractoriness to adrenaline & selective ß-adrenergic agonists. Higher doses of adrenergic drugs are required for the desire effect;
Inj. Glucagon 0.5-1 mg IV /M/SC, repeated 20 mins later or continuous infusion of glucagon, 1 to 5 mg / hour, may be given if required

Treatment Summary :

- Maintain ABC,
- O2 inhalation (High flow oxygen.)
- IV fluid challenge (NS)
- Inj Adrenaline
- Inj Chlorphenamine
- Inj Hydrocortisone

1) Life-threatening problems:
Airway: swelling, hoarseness. Stridor
Breathing: rapid breathing, wheeze, fatigue, cyanosis, SpO2, < 92%, confusion
Circulation: pale, clammy, low blood pressure, faintness, drowsy/coma
2) Adrenaline (give IM unless experienced with IV adrenaline)
IM doses of 1:1000 adrenaline (repeat after 5 min if not better)
Adult & Child more than 12 years: 500 micrograms (or 0.5 mL) IM
Child 6-12 years: 300 micrograms (or 0.3 mL) IM
Child < 6 years: 150 micrograms (or 0.15 mL) IM
Adrenaline IV to be given only by experienced specialists
3) IV Fluid challenge (NS Adult: 500-1000ml child: 20ml/kg

	4) Chlorpheniramine(IM or IV slowly)	**5) Hydrocortisone (IM or IV)**
Adult or child >12 year	10mg	200mg
Child 6-12 years	5 mg	100mg
Child 6 months-6years	2.5mg	50mg
Child < 6 months	250 micrograms/kg	25mg

ANGIOEDEMA

Definition; The rapid edema, or swelling, of the area beneath the skin or mucosa (Allergic/ hereditary).
Hereditary Angioedema (HAE): 1 esterase inhibitor deficiency, is a disease an AD inherited condition that affects approximately 1 in 50,000 people (HAE is Hereditary or acquired)

Chief Complaint:

- Recurrent episodes of angioedema without urticaria or Pruritis, which most often affect the skin or mucosal tissues of the upper RT & GIT
- Attacks Commonly involve extremities, abdomen genitourinary tract, face, oropharynx and larynx
- Can occur Spontaneously or be acquired
- Patient HAE (of any type) don't response to antihistamine therapy

HX: family Hx of angioedema, drug Hx: ACEi

Investigation:

1) Complement C4 level
2) C1-INH Protein level, C1-INH function also be measured

ACE (ACE inhibitors)

Are also known to cause angioedema, they typically manifest within 4 weeks after the beginning of therapy,

Rx: **Date:** **Time:**

- Bed rest
- C1 esterase inhibitor (C1-INH) Concentrate 20 units/kg
- Recombinant human C1-INH
  For acute attack: Dose: 50 units/kg
- Tab Icatibant 30mg
- Tab Ecallantide

Fresh frozen plasma (FFP):

- Contain <1 esterase inhibitor
- Plasma is 2nd line therapy in the acute Treatment of laryngeal attack and severe gastrointestinal attacks
- 2 unit of Fresh Froen Plasma (FFP) are given initially. The dose can be repeated every 2-4hrs until there is clinical improvement

FLUIDS

CRYSTALLOIDS; IV Fluid Containing varying concentration of electrolytes
e.g. Normal saline (NS, Ringer lactate (RL), Plasmalyte, glucose, Dextrose
COLLOIDS: IV fluid containing large protein & molecules that tends to stay within in the vascular space e.g., Albumin, Mannitol, aminoleban, panamine G

- Hypertonic crystalloid; A crystalloid solution that has a higher concentration of electrolytes than the body plasma.
- Hypotonic crystalloid; A crystalloid solution that has a lower concentration of electrolytes than the body plasma.
- Isotonic crystalloid; A crystalloid solution that has the same concentration of electrolytes as the body plasma, e.g., 0.9%NS, RL, D5W

0.9% NaCl (normal saline or NS)	Isotonic
0.45% NaCl (Half NS)	hypotonic
Lactated Ringer's solution (RL)	Isotonic
Dextrose 5% W (acts as a hypotonic solution in body) (5%DW)	Isotonic
Dextrose5% NaCl (DNS)	hypotonic
3% and 5% Sodium Chloride Injection	hypotonic

ISOTONIC SALINE (0.9% Sodium Chloride) or NS 0.9%

❖ Nacl 0.9%

➢ 0.9% Sodium Chloride Injection, contains 9 gm/L Sodium Chloride (NaCl), with an osmolarity of 308 mOsmol/L

➢ The osmolarity of normal saline is a close approximation to the osmolarity of NaCl in blood (Isotonic).

➢ Normal serum osmolality is 275-295 mOsm/kg (mmol/kg)

➢ It contains 154 mEq/L sodium and 154 mEq/L chloride

NS indication (Uses)

1. Hypovolemic shock, hypotension
2. Fluid loss associated e electrolyte disturbance severe vomiting, diarrhea, dehydration, burns
3. Hypokalemia, mild Hyponatremia, hypercalcemia
4. Prerenal kidney failure due to hypovolemia
5. Diabetic ketoacidosis /Hyperosmolar Hyperosmotic State (HHS)
6. Dilution of various drugs
7. Sterilization of wound and burns
8. Irrigation of bladder, abdomen etc.

Contraindications

- Fluid overload states (Pulmonary edema, congested heart failure, cerebral edema) Liver cirrhosis
- Note: NS is slightly hypertonic and has equal amounts of Nacl, making it both hypernatremia and very hyperchloremic relative to the plasma.
- Thus, massive NS infusion will lead to hypernatremia and hyperchloremic metabolic acidosis and its associated sequelae such as renal vasoconstriction

HALF NS (0.45%) or HYPOTONIC SALINE 0.45%

Half NS (0.45%) contains half the sodium mEq (77) that NS contains and is considered hypotonic. (0.45 % NS is Hypotonic, 0.9% NS is Isotonic)

Indication (Uses)

1) Hypernatremia
2) HHS and DKA after initial treatment with 0.9% NS
3) Gastric fluid loss from NG suctioning or vomiting

Contraindications: Hepatic /Liver diseases, Burn

HYPERTONIC SALINE (NS 3%, NS 4%, NS 5%)

Contain:
- Nacl: 3%
- Nacl: 4% and Nacl: 5%

Indication (Uses)
- Severe Hyponatremia (< 120 mEq/L)
- Nebulization in acute bronchiolitis

DNS Vs D5W (5% dextrose in water)

- DSW (5% dextrose in water), which consists of 50 gm /L dextrose only, No sodium in it
- DNS or DSNS (5% dextrose in normal saline), which, in addition, contains normal saline (0.90% of NaCl). [Dextrose 50 gm + 154 mEq/L sodium and 154 mEq/L chloride.]
- 5% glucose/dextrose solution contains 50 mg/ml of glucose/dextrose (or 5% dextrose means the solution contains 5g/100ml of solution).
- Glucose provides energy 4 kcal/gram, so a 5% glucose solution provides 0.2 kcal/ml (5 gm in 100 ml in 5% solution - 20 kcal/100 ml or 100 kcal/ 500 ml)
- 1 L DNS contains: Glucose 50 gm (200kcal), Sodium 154 mEq, Chloride 154 mEq

DSW (5% dextrose in water)

Contains:
- DSW (5% dextrose in water), which consists of 278 mmol/L dextrose (Isotonic)
- 5% glucose/dextrose solution contains 50 mg/ml of glucose/dextrose, (5% dextrose means the solution contains 5g/100ml of solution, 50gm in 1 L
- Glucose provides energy 4 kcal/gram (1L = 50 x 4 =200 Kcal)
- DSW is indicated as a source of water, calories.

Indication (Uses)
- For calories (Nutrition)
- In Hypernatremia, hyperkalemia
- During the treatment of DKA once the sugar reaches ≤ 250mg/dL levels
- In Hypoglycemia (for preventing further episodes after initial correction)
- Hepatic coma,

Caution:
Diabetse mellitus, severe dehydration, Hyponatremia

RINGER LACTATE (RL)

Contain: Na Lactate, K, Cl, Ca
- Lactated Ringer's solution (also known as sodium lactate solution and Hartmann's solution) is a solution that is isotonic
- It is the most physiological fluid as its electrolyte content is nearly similar to the free concentration in plasma. So very large volumes of RL can be infused without any problem
- Crystalloids with a chemical composition that approximates extracellular fluid have been termed "balanced" or "physiologic" solutions and are derivatives of the original Hartmann's and Ringer's solutions.
- But none of the proprietary solutions are either truly balanced or physiologic

Indication (Uses)
1) Diarrhea induced hypovolemia, Cholera
2) Severe hypovolemia which requires large volume of fluids: lactate solution is very often used for fluid resuscitation after a blood loss due to trauma, surgery, or a burn injury. Ringer's lactate solution is used because by-products of lactate metabolism in the liver counteract acidosis,
3) In postoperative patients, Burns, For peritoneal irrigation
4) RL & other crystalloids are also used as vehicles for the IV delivery of various drugs.

Contraindication / Caution:
- Hepatic patient (Liver diseases)
- Lactic acidosis
- Diabetes mellitus (DM)

PLASMALYTE

Plasmalyte is a family of balanced crystalloid solutions with multiple different formulations available worldwide. It closely mimics human plasma in its content of electrolytes, osmolality, and pH. These solutions also have additional buffer capacity.

Contain:

- It is crystalloid solution, the composition of which is even more closely physiological than RL solution
- 1L has an ionic concentration of 140 mEq Na^{++}, 5 mEq K^{+}, 3 mEq Mg^{++}, 98 mEq Cl^{-}, 27 mEq acetate,& 23 mEq gluconate.

Indication (Uses)

- Better than Ringer lactate, Normal saline
- Best solution in all type of resuscitation
- Expensive than Normal saline and Ringer lactate

Caution:

Renal failure

Albumin (Human) 20%

- Albumin (Human) 20 % is a sterile, liquid preparation of albumin (20 gm in 100 ml) derived from large pools of human plasma.
- Albumin is responsible for 70-80% of the colloid pressure of normal plasma, thus making it useful in regulating the volume of circulatory blood.
- Oncotic pressure, or colloid osmotic pressure, is a form of osmotic pressure exerted by proteins, notably albumin, in a blood vessel's plasma (blood/liquid) that usually tends to pull water into the circulatory system. It is the opposing force to hydrostatic pressure.

Mannitol (5%, 10%, 20%, 25%)

Uses (osmotic diuretics)

Increase Intracranial pressure,
Brain edema
Excretion of toxins
Hemorrhagic CVA
Acute congested Glaucoma

Important to know: 1 Liter of following IV fluids can elevate intravascular volume by

Fluid type	5% Dextrose	Normal saline (NS)	Colloids
1 Liter	75-100 ml	300 ml	1000 ml

SELECTION OF IV FLUID:

Condition	IV Fluid
Hypovolemic Shock	NS, RL
Diarrhea	NS, RL
Vomiting	NS, Isolate G
Starvation	5 % Dextrose
Burns	RL
DKA	NS
HHS	Half NS

NS; normal saline, RL; Ringer Lactate. Half NS 0.45%

Trauma/Massive Transfusion Protocol

Classification of hemorrhagic shock

Class	% of blood loss	Clinical findings	Treatment
1	<15% (750ml)	No major change in healthy person	Observe
2	15-30 (750-1500 ml)	Tachycardia, Narrow pulse pressure, Mild moderate hypotension, Compensatory peripheral, vasoconstriction, mild metal confusion	Fluid therapy
3	30-40 (1500-2000 ml)	Hypotension Peripheral hypo perfusion, Mental confusion	Fluid therapy + Blood transfusion if Hb% <7gm
4	>40 (>2000 ml)	shock	Blood transfusion

Management:

ABCDE

A: Airway maintain with Cervical spine (C-spine) protection
B: Breathing and ventilation
C: Circulation with hemorrhage Control
D: Disability (evaluation of neurologic Status)
E: Exposure complete visualization prevention of hypothermia.

- Maintain ABCDE
- **Oxygen inhalation stat &** SOS.
- **Bed rest**
- **Inj. Tranexamic acid 5oomg** (Transamine) 2 amp IV Over 10 mins Followed By infusion of 1mg over shout. (1g in IL NS IV @ 25 drops/min)
- Controlled Hypotension: Maintain MAP of 50 to 60 mmHg in patient without brain injury.
- Blood transfusion & Do blood group and cross match
- Pass 2 IV lines
- In patients with compensated shock after blunt trauma, a fluid bolus of 20-30 mL/kg of warmed NS or RL over 10 to 15 minutes.
- Blood and/or blood substitutes should be given early in hemorrhagic shock patients not readily responding to crystalloid infusion of 40-60 ml/kg.
- A transfusion of 10 mL/kg of packed red blood cells (PRBC) should be considered if there is inadequate clinical improvement after IV boluses of 40 to 60 mL/kg of normal saline.

Investigation in Trauma:

- **CBC:** Hb and HCT normal or Slightly ↑ in early phases then drops
- **Fast scan:** Abdominal, chest bleeding. AND **CXR, CT, CT angiogram**

Coagulopathy in trauma - Lethal triad

Resuscitation-associated (Dilutional) coagulopathy.

- **Hypothermia:**

The effect of hypothermia on clotting includes platelet dysfunction and impaired enzymatic function.

- **Acidosis**

causes demonstrable clotting dysfunction in experimental models at pH <7.2

Massive Transfusion Protocol:

- Massive transfusion, historically defined as the replacement by transfusion of 10 units of red cells in 24 hours
  Or Replacement of >1 blood volume in 24 hours, or
- >50% of blood volume in 4 hours (adult blood volume is approximately 70 mL/kg), or
- Or rapid bleeding rate (>150 mL/minute of blood loss) is documented or observed.
- In children: transfusion of >40 mL/kg (blood volume in children over 1 month old is approximately 80 mL/kg)
- A Massive Transfusion Protocol should be used in critically bleeding patients anticipated to require massive transfusion

Massive fluid management complications

- **Free hypocalcemia after massive transfusion:** If ionized hypocalcemia develops: give
  - Inj. calcium gluconate 10% 10 to 20 mL should be given IV (into another vein) for each 500 mL of blood infused.

Hypothermia: Rapid transfusion of multiple units of chilled blood may reduce the core temperature abruptly and can lead to cardiac arrhythmias and hypothermic coagulopathy.

- A high capacity commercial blood warmer should be used to warm blood components toward body temperature when more than three units are transfused

- **Dilutional coagulopathy**
  - Clinical studies that have shown a benefit for the 1:1:1 (One unit of RBC with every unit of plasma and platelets) approach in massively injured and rapidly bleeding patient

Hyperkalemia: Infants and patients with renal failure may develop hyperkalemia. To minimized risk of hyperkalemia: Select only red cells collected less than 10 days prior to transfusion or Any unit of red cells can be washed immediately before infusion to remove extracellular potassium

Early management

- IV Crystalloids 20-30 ml/Kg bolus. Excessive infusion of crystalloid (i.e., ratio of crystalloid to PRBCs >1.5:1) has been associated with worse outcomes in patients with severe hemorrhage and should be avoided.
- MTP: For trauma patients with severe, ongoing hemorrhage that is unlikely to be controlled quickly or adequately, immediate transfusion of blood products in a 1:1:1 ratio of PRBCs, fresh frozen plasma (FFP), and platelets should be given.
- MAP) around 65 mmHg (50-60) or an SBP around 90 mmHg is a reasonable goal in penetrating trauma (MAP = [(2 x diastolic) + systolic1/3).
- Typed and cross-matched PRBCs are best, but it may not be available always. In such situations immediately using type O Rh-positive or type O Rh-negative for males and type O Rh-negative for girls and women of child-bearing age, until type-specific or typed and cross-matched blood is available.
- Hypothermia must be controlled during transfusions.

DROWNING

Definition: Drowning is respiratory impairment secondary to submersion in a liquid medium, an air liquid interface is present at the entrance to the victim`s airway, which prevents the individual from breathing oxygen, it can be non-fatal or fatal.

Chief complaint:

Hypoxia: Hypoxia is the major problem in drowning, affects the brain, heart, & other tissues; respiratory arrest followed by cardiac arrest can occur.

- Beware "silent" bronchospasm
- Brain and Generalized tissue hypoxia
- Aspiration can produce to pneumonitis, sometimes with anaerobic fungal lung infections, and pulmonary edema

2. **ARDS:** (Acute Respiratory distress syndrome) cause: Hypoxia/aspiration
3. **Pneumonia/chemical pneumonitis**

- Pneumonia common with submersion in stagnant warm & fresh water.
- Chemical pneumonitis is a more common sequel than pneumonia, especially if the submersion occur in a chlorinated pool or in a bucket containing a cleaning produce

4. **Systemic hypothermia**
5. **VT,VF, bradycardia, asystole**

O/E:

- Vitals (pulse, BP, spo2%, temp)

Investigation:

1) **ECG, RBS, Serum electrolyte, ABGS**
2) **CXR**
3) **X-ray–spine;** cervical spine trauma may be present in any victim of shallow or rocky water immersion injury

Rx: **Date:** **Time:**

First AID

- Give attention to cervical spine stabilization
- Debris visible in the oropharynx should be removed with finger sweep maneuver.
- Rescue breathing is done using a jaw thrust without head tilt or chin lift

Air way: O_2 inhalation (High flow, 10% oxygen)

- If hypoxia a dyspnea persist despite 100% oxygen)
  - ➢ Intubation, PEP or PAP/BIPAP
  - ➢ ETT and mechanical ventilation indicated in awake individuals who are unable to maintain adequate oxygenation on O_2 by mask or via (PAP) or in whom airway protection is warranted

Breathing

- Extra corporeal membrane oxygenation (ECMO) has been shown to be beneficial in selected patients.

Rewarm patients

- Rewarm Patients with a core temp of <34°C (<93°F)
- Passive rewarming with blankets and a warm room
- Active internal rewarming if temp <30°C (86°F)
- They may include the administration of warmed (42° C to 46° C[108° F to 115° F]) humidified oxygen, use of extracorporeal membrane oxygenators, peritoneal lavage, intravenous administration of warmed (42° C to 44° C [108° F to 111° F]) saline, and esophageal rewarming tubes
- **More detail on management see next page**

Types of drowning:

- ❖ Warm water drowning: occur at ≥20°C water temp
- ❖ Cold water drowning: occur at <20°C water temp
- ❖ Fresh water, saltwater or natural bodies of water versus mam made

Duration of submersion	Risk of death or poor out come
0 – 5min	10%
6 – 10min	56%
11 – 25min	88%
>25 min	Nearly 100%

Rapid core rewarming:

Treatment of severely hypothermic victims (core temperature <30°C [86 °F]) in cardiac arrest in the hospital should be directed at rapid core rewarming. Technique include:

- Administration of warmed, humidified oxygen (42 °C to 46 °C [108 °F to 115 °F])
- Administration of warmed intravenous fluid (normal saline) at 43 °C (109 °F) infused centrally at rates of approximately 150 to 200 mL/h (to avoid overhydration)
- Peritoneal lavage with warmed (43 °C [109 °F]) K^+ free fluid administered 2 L at a time

❖ **Automated external defibrillators (AEDs):** breathing and circulation, but some modifications in approach are required. If the hypothermic victim is in cardiac arrest, the general approach to BLS management still targets airway,

- If Ventricular tachycardia (VT) or Ventricular fibrillation (VF) is present, attempt defibrillation
  - Automated external defibrillators (AEDs) should be available on virtually all BLS rescue units, and if VF is detected, emergency personnel should be allowed to deliver up to 3 shocks to determine fibrillation responsiveness
  - If VF persists after 3 shocks, further defibrillation attempts should be deferred.
- Emergency personnel should immediately begin CPR and rewarming (administers warmed, humidified oxygen and warmed intravenous saline and attempt to stabilize the victim for transportation.
  - If core temperature is <30 °C (86 °F), successful conversion to normal sinus rhythm may not be possible until rewarming is accomplished

❖ **ACLS management :**

- The hypothermic heart may be unresponsive to cardio active drugs, pacemaker stimulation, and defibrillation, and metabolism is reduced.
  - Although administration of epinephrine and vasopressin has been shown to improve coronary artery perfusion pressure in animals, there is concern that administered medications, including epinephrine, lidocaine, and procainamide, can accumulate to toxic levels in the peripheral circulation if they are administered repeatedly in the severely hypothermic victim.
- For these reasons intravenous drugs are often withheld if the victim`s core body temperature is <30° C (86° F).
- If the victim`s core body temperature is >30° C (86° F), IV medications may be administered but with increased intervals between doses.
- **Wait for Temp >30 °C (86 °F):**

✓ If the patient fails to respond to 3 initial defibrillation attempts or additional boluses of medication should be deferred until the core temperature rises above 30 °C (86 °F).

✓ (not dead until warm and dead)

✓ Bradycardia may be physiological in severe hypothermia, and cardiac pacing is usually not indicated unless bradycardia persists after rewarming.

Hypothermia

Defition: A potentially dangerous drop in body temperature below 35°C (95°F) usually caused by prolong exposure to cold temperature.

- Mild hypothermia; Core temperature 32°C to 35 °C (90 to 95 °F)
- Moderate hypothermia; Core temperature 28°C to 32 °C (82 to 90 °F)
- Severe hypothermia; Core temperature below 28°C (82 °F)

Chief Complaint:

❖ **Mild Hypothermia:**

Tachypnea, tachycardia, initial hyperventilation, ataxia, dysarthria, impaired judgment, shivering and so called "cold diuresis".

❖ **Moderate Hypothermia**

Proportionate reductions in pulse rate. Cardiac , hypoventilation, central nervous system depression, Hyporeflexia, decrease renal blood flow and loss and shivering, paradoxical undressing may be observed if junctional bradycardia.

❖ **Severe Hypothermia**

Pulmonary edema, oliguria, Areflexia, Coma, hypotension, bradycardia, ventricular arrhythmias and asystole

On Examination:

Vital (Pulse, BP, Spo2%, Temp) JACKLET, GCS

Investigation:

1) **ECG; Osborn wave** (Positive deflection at the J point with a dome or hump configuration).
2) **RBS, Serum electrolyte, CBC, LFTS, RFTS**

Target temperature management (TTM):

- Traditionally refers to deliberate reduction of the core body temperature to a range of 32 - 36 °C (89.6 - 97.2°F) in patient who don't regain consciousness after return of spontaneous circulation (ROSC) following a cardiac arrest.
- TTM has been used in many settings, such as for neuro protection, in cardiac surgery and hyper thermic emergencies like heat strokes etc.

Rx: **Date:** **Time:**

- **Maintain ABC** (Airway, breathing, circulation).
- CPR in patient with accidental hypothermia who sustain a cardiac arrest.
- **Pass 2 large** (14 or 16 gauge) IV lines.
- **Monitor vitals**
- BP maintain with warmed (40 To 42 °C) Infusion of isotonic warmed crystalloid.

Passive external rewarming (PER):

Treatment of choice for mild hypothermia after wet clothing is removed, the patient is covered with blankets or other types of insulation.
Maintain room Temp at 28 °C if possible

Active external rewarming (AER):

- Some combination of warm blankets, heating pads, radiant heat, warm baths, or forced warm air is applied directly to the patient's skin.
  Indicated in moderate to severe hypothermia (< 32 °C) and for patient with mild hypothermia who are unstable lack physiological reserve, or fail to respond to PER

Active internal (core) rewarming (ACR):

- Most aggressive strategy.
- Use in patient with severe hypothermia (< 28°C) or moderate hypothermia, who fail to respond to AER.
- In addition to IV warmed crystalloid effective techniques include irrigation of the peritoneum or Thorax (via pleural space) with warmed isotonic crystalloid & extracorporeal blood rewarming

STERIODS

ACTIONS OF GLUCOCORTICIODS

Common uses of glucocorticoids

Respiratory disease	Asthma (mainly during acute episodes), COPD, Sarcoidosis, ILD, Acute respiratory distress syndrome, Pneumocystis jirovecii pneumonia in AIDS, Large or rapidly accumulating pleural effusions
Cardiac disease	Post-myocardial infarction syndrome Tubercular pericarditis / pericardial effusion
Renal disease	Selected cases of nephrotic syndromes and glomerulonephritis
GIT diseases	Autoimmune hepatitis
Rheumatological disease	Systemic lupus erythematosus (SLE) Rheumatoid arthritis (complications) Vasculitis, Polymyalgia rheumatic, Cranial arteritis
Neurological disease	Cerebral edema (mainly in ICSOL), Vasculitis
Skin disease	Pemphigus, eczema, allergy
Tumor:	Lymphomas
Transplantation	Immunosuppression
Tuberculosis	Pericardial effusion, large ascites, peritonitis Massive/ rapidly accumulating pleural effusion, Eye involvement, Genital TB, TB adrenalitis

Precautions before starting steroids:

- Rule out Tuberculosis (Chest x ray), Monitor hypertension(Check BP)
- Hx of Diabetes/gestational diabetes: check blood sugar(RBS)
- Evidence of Osteoporosis (bone density assessment in post-menopausal patients, old age)
- Hx of peptic ulcer, gastritis or esophagitis – add PPI (omeprazole or esopmerazole etc)

Common side effect of steroids:

- **Physiological:** Adrenal gland / or pituitary suppression
- **Pathological**
  - **Gastrointestinal:** Peptic ulcer, pancreatitis, **Renal**: polyuria, Nocturia
  - **Cardiovascular:** Increase blood pressure, **Skin:** Thinning, easy bruising
  - **Bone**: Septic necrosis of hip, pathological factures, **Eyes**: Cataracts
  - **CNS:** Proximal myopathy, depression, Euphoria, Psychosis, Insomnia
  - **Endocrine:** Weight gain, Glycosuria/ hyperglycemia, diabetes, impaired growth, amenorrhea,
  - **OTHER:** Increased susceptibility to infection (sign of fever are frequently masked), Septicemias, fungal infections, reactivation of TB

Prevention of side effects of steroids:

- All patients treated with glucocorticoid medications should receive bone protection to prevent glucocorticoid-induced osteoporosis unless contraindicated.
- Consider pneumocystis pneumonia prophylaxis for any patient on ≥ 20mg/day of prednisone for > 1 month, and any patient treated with immunosuppressive regimens
- Consider pneumococcal and influenza vaccine in season, and screening for tuberculosis in patients on corticosteroids or other immunosuppressant therapy
- Always prescribe PPI (omeprazole or esopmerazole etc) While prescribing steriods

Management of side effect of steroids:

Diet:

- Low caloric intake to prevent weight gain or if glucose intolerant
- Low sodium intake to prevent edema and hypertension
- Supplementary potassium if needed

Steroids should be given after PPI (omeprazole or esopmerazole etc)

Start; H2 receptor antagonist (e.g, Famotidine) or PPI along with steroids

To avoid Osteoporosis:

- Calcium tablets (1200mg/d elemental calcium) and Vitamin D 800-100 IU/d (inj D-Tress 1 amp/weeek)
- Consider bisphosphonate prophylactically

Advice for Patient on Glucocorticoid replacement therapy:

Stress	E.g. Fever – double the dose of hydrocortisone
Surgery	Minor surgery- hydrocortisone 100mg IM. Major surgery- hydrocortisone 100mg 6-hourly for 24 hours, then 50mg IM 6-hourly until ready to take

Equivalent doses (IV or oral) of glucocorticoids:

Drugs	Dose	Duration of action hours
Hydrocortisone	20 mg	8-12
Methylprednisolone	4 mg	12-36
Prednisolone	5 mg	12-36
Deflazacort	6 mg	12-36
Cortisone acetate	25 mg	8-12
Dexamethasone	0.5 mg	36-72

Mineralocorticoids: Mimic cortisol, hormone produced by our body & mimic aldosterone: mineralocorticoids cause retention of sodium (&water); Fludrocortisone and Hydrocortisone

The Relative glucocorticoid and mineralocorticoids Potency of Steroids:

Drug	Glucocorticoid	Mineralocorticoids
Hydrocortisone	1	1
Methylprednisolone	5	<0.01
Prednisolone	4	0.25
Betamethasone	25	<0.01
Dexamethasone	30-40	<0.01

Steroid with drawal: If to be use for less than 2weeks then can be stopped without tapering.

In chronic use: Tapered very slowly

Deflazacort: Efficacy & S/E profile similar to prednisolone 6mg of it has the same anti-inflammatory potency as 5mg prednisolone, less GI adverse effects when compare with other steroids.

Poisoning

TOXIN, ANTIDOTES

Toxin	Antidotes
β-Blockers	**Inj. Glucagon**: 5-10 mg IV & assess for efficacy, Re-bolus as needed every 10 min **IV lipid emulsion:** 1.5 mL/kg bolus (100 ml 20% bolus), 0.25-0.5 ml/kg/min iv drip **IV insulin:** (1 IU/kg, then 0.5 IU/kg/hour infusion)) in high **doses with IV glucose** (25gm IV bolus with 25 gm /hour infusion). **Norepinephrine infusion, Transcutaneous/Transvenous Pacing**
Calcium Channel blockers	**Inj. Calcium gluconate** 10% 60ml IV (0.6-1.0 mL/kg in children) **IV insulin** (1 IU/kg, then 0.5 IU/kg/hour infusion)) **in high doses with IV glucose**(25gm IV bolus with 25gm/hour infusion) IV lipid emulsion1.5 mL/kg bolus (100 mL 20% bolus), 0.25-0.5 mL/kg/min drip. Transcutaneous/Transvenous Pacing
Snake bites	**Polyvalent ASV** (Anti-Snake venom) 10 vial in 500ml NS IV over 100 minutes
Paracetamol	• **Inf. 5% dextrose saline 200ml + Inj. N-acetylcysteine (NAC)** 150mg/kg slow IV Over 15 to 60 minutes **THEN** Inf. 5% dextrose saline 500ml+ Inj. N-acetylcysteine 50mg/kg IV @ 10drops/min (or over 4 hours)**THEN** Inf. 5% dextrose saline 1L+ Inj. N-acetylcysteine 100mg/kg IV @ 20microdrops/min (or over 16 hours) • **Inf. dextrose saline** 1L+**Inf NS** 1L IV 40 drops/min **IF IV NAC not available then:** • **Acetylcysteine sachet 200mg (Mucolator sachet)** 1+1+1 (one sachet TDS) **OR** • **Tab Acetylcysteine 600mg** 140mg/kg stat and 70mg/kg every 4 hours (total of 17 doses) **OR** • **Methionine 2.5gm stat** and 2.5 gm 4 hourly (total 4 doses, 10gm)
Anticholinergic atropine, belladonna alkaloids	**Physostigmine:** IV 0.5-2.0 mg at a rate of no more than 1 mg/min **Neostigmine:** IM, IV, S/C: 0.01 to 0.04 mg/kg every 2 to 6 hours
Benzodiazepines	**Flumazenil:** 0.2 mg IV over 30 seconds. Repeated doses of 0.2 mg, to a max dose of 1 mg
Botulism	**Botulinum antitoxin:** 20 mL (1 vial) IV infusion; dilute further with 0.9% NS to 1:10 ratio before administering. Infusion starting at 0.5 mL/min for initial 30 minutes If no infusion-related reaction, may increase to 1 mL/min IV for next 30 minutes, then if no reaction evident, may increase to 2 mL/min for remainder of infusion
Cyanide	**Sodium thiosulfate:** 12.5 g (50 mL of a 25% solution); may repeat at one-half the original dose if symptoms of cyanide toxicity return + **Hydroxocobalamin** 70 mg/kg (typical adult dose is 5 g) has provided successful treatment of severe poisoning
Digitalis glycosides (digoxin, Oleander, foxglove)	**Digoxin-specific Fab fragments**: Give 40 mg (1 vial) digoxin-Fab at a time and repeat after 60 min if patient is still symptomatic, In general, 40-120 mg (1-3 vials) should be sufficient.
Ethylene glycol, methanol	**Fomepizole:** dose 15 mg/kg in 100 ml 5% dextrose saline IV over 30 min followed by 10 mg/kg IV 12th hourly for 4 doses **Ethanol:** loading dose 10 ml/kg of 10% EtOH in 5%dextrose saline IV over 30 min, (OR give PO/NG), then infusion (in chronic alcoholic 2 ml/kg/hour in moderate drinker 1.4 ml/kg/hour and in non-drinker 0.8 ml/kg/hour).
Heavy metals	**Chelating drugs:** succimer, dimercaprol (BAL), edetate calcium disodium, deferoxamine, and Penicillamine.
Ionizing radiation	**Potassium iodide:** Dose 130mg /day

TOXIN	ANTI-DOTES
Iron	**Deferoxamine:** IM for all patients NOT in shock, start 1g IM initially and then 500mg every 4hr for 2 doses, Depending upon clinical response, subsequent doses of 500mg every 4-12hr Maximum dose: 6g in 24 hours IV administration for patients in shock; 1g slow IV infusion not > 15mg/kg/hr for the first dose; subsequent doses can be infused at a faster rate than 125mg/h
Isoniazid (INH)	**Pyridoxine (vitamin B6):** 5 g of pyridoxine is given IV over 5-10 minutes. Repeat dose needed for persistent seizure activity & may also be used to reverse deep coma. For Seizures: **IV diazepam (Inj valium)** 5 mg/**Lorazepam** 0.1 mg/kg (repeat if needed)
Methemoglobin-forming agents	These are (e.g, aniline dyes. Local anesthetics, nitrates, nitrites. sulfonamides) **Methylene blue**: IV 1 mg/kg over 5-30 minutes, in emergency Milder cases and follow-up of severe cases can be treated with methylene blue (60 mg slow IV three to four times per day) or ascorbic acid (300-600 mg/d).
Methotrexate (MTX)	**Leucovorin (folinic acid):** 20 mg doses (or 10 mg/m2) IV or IM, QID until serum methotrexate concentration falls below 10-8 M (assessed every 12-24 h) or until the total dose of folinic acid is at least equal to the dose of Methotrexate **Glu-carpidase:** approved for reversing MTX toxicity (plasma MTX concentration > 1 µmol/L) In patients with delayed MTX clearance resulting from renal dysfunction. Dose: single IV bolus injection of 50 units/kg administered over a period of 5 minutes.
Opioids	**Naloxone** : Inj. Naloxone 4mg/10ml (0.4mg/ml) 2mg in adults; 0.1 mg/kg in children
Tricyclic antidepressants	**NaHCO**: 50 mmol/50 mL single use pre-filled syringes for rapid administration
Unfractionated heparin	**Protamine**: 1-1.5 mg per 100 units of heparin; not > 50 mg. 1 mg for 1mg enoxaparin, 1 mg for 100 units dalteparin or tinzaparin
Valproic acid	**L-Carnitine**: For symptomatic patients with hyperammonemia: Loading dose of 100 mg/kg IV(6 g maximum) over 30 minutes followed by maintenance doses of 15 mg/kg every 4 hours over 10-30 minutes. For asymptomatic with hyperammonemia: Oral doses of 100 mg/kg/day QID
Warfarin	**Inj. Vit K**: (K-LOT) 1 amp IV daily 3 days, **Oral vitamin K**, (phytonadione) 120 mcg/day PO **Fresh frozen plasma** 15 mL/kg (1 pint = 150ml so for 60kg; 4 pint will be needed) **Prothrombin complex concentrate** (PCC) 50-100 units/kg IV BD **Recombinant factor VIIa** (rFVIIa; Novo Seven) doses ranged from 16.3-87.35 mcg/kg
Organophosphates	**Inj. Atropine:** Initial dose 1 mg IV, if no adverse effects give 2 mg every 15 minutes till the patient develops atropinization (Mydriasis, Tachycardia, Bronchodilator, Dry axilla) **Pralidoxime:** 1 gm (at least 30 mg/kg in adults, and 25-50 mg/kg for children in 100 ml NS IV over 30 minutes) 8th hourly for 1st 24-48 hours.
Carbamates	**Inj. Atropine:** Initial dose 1 mg IV, if no adverse effects give 2 mg every 15 minutes
Sulfonylurea	**IV dextrose** 50% initially then continue with 10% Dextrose saline. **Octreotide:** in children; 1-1.5 µg/kg IV or SC, followed by 2-3 more doses 6 hour apart. In adults, octreotide 50 µg SC or IV. Followed by three 50 µg doses every 6 hours. During this treatment IV dextrose infusion should be gradually tapered off.
Thallium	**Prussian blue:** 250 mg/kg/day, divided every 6-12 hours.

BEE STING

Stinging insects belong to Hymenoptera class of the Insects which cause local toxic reactions in all individual & allergic reactions only in those previously sensitize.

Chief Complaint

- **Local reactions to sting are:**

  Immediate burning, transient pain, and itching with an area of erythema, swelling, & induration up to a few centimeters across
- **Allergic reaction may manifest as:**

  Urticaria, angioedema, bronchospasm, refractory hypotension, & shock.
  (remember swelling alone is not a manifestation of allergic reaction)
- **Local infection & ulceration** can occur afterwards

On examination:

- Vitals: (Pulse, BP, Spo2%, Temp)
- Airway should be assessed for signs of allergic reaction

Investigation: No need

Toxins:

- Many species of bees & wasps have two poison glands, one secreting toxin contain formic acid, and the other one is alkaline neurotoxin; the combination has strong irritating properties
- The sting has its own ganglia and it continue to saw into the targets flesh & release venom for several minutes. That's why removal of any stingers should be done as soon as possible

Rx: **Date:** **Time:**

Removal of any stingers : Methods:

- Like scraping with a thin dull edge (e.g, edge of credit card, dull side of scalpel, thin table knife) can be used.
- Wash the sting with soap and water.
  Icing the sting site is the most effective way to reduce venom absorption
- **Maintain ABC (airway, breathing, circulation)**
- **For pain, burning, & itching**
  Ice cube wrapped in a cloth over sting area

If pain is Severe:

- **Inj. ketorolac Tromethamine 30mg/ml (Toradol)**
  IV stat and SOS

Anti-histamine + anti allergic:

- **Inj. Pheniramine maleate (Avil)**
  IV or IM stat
- **Inj. Dexamethasone (Dexa, Decadron) 4mg/ml**
  IV or IM STAT
- **Inf. Normal saline 0.9% 1L**

IV @ 50 drops/ minute (adjust according to BP)

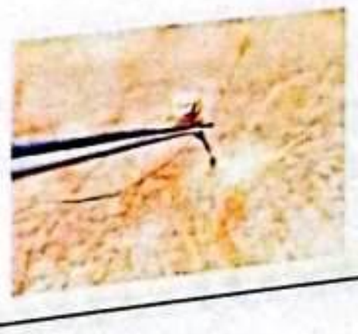
If Patient is in Shock treat it as anaphylactic shock :

1) O2 inhalation
2) Inj. Hydrocortisone (Hyzonate) 250mg IV stat
3) IV fluid (Normal saline)
4) Inj. Adrenaline 1mg/ml
   0.3 to 0.5 ml IM STAT (anterior thigh)
5) For more detail see topic anaphylactic shock

Bee

wasp

Fire Ant



SNAKE BITE

Neurotoxic: Cobra and common krait. **Hemotoxic**: Scaled viper. **Neurotoxic & hemotoxic**: Russell`s viper.

Chief Complaint:

- **Neurological;** Ptosis, opthalmoplegia, Nasal voice neurological weakness (Elapidae, Russell`s viper)
- Vomiting, abdominal pain, Shallow breathing
- **Renal failure;** (Hump nose pit viper, saw scaled) less or no urine output, black urine
- Pituitary/adrenal insufficiency (Russell`s viper)

History of Snake bite

O/E: Vitals, Fang mark, local swelling, tender node

- Skin condition, Broken neck sign
- Oliguria – red urine or black urine

Investigation

1) **20 min whole blood clothing or PT/INR**
2) **CBC** (TLC-↑ infection/inflammation
   ↓platelet (thrombocytopenia)-viper
   (Fragmented RBC) hemolysis-viper
3) **Serum CK;** Elevated (sea snake, Russell`s viper)
4) **Serum Creatinine:** Elevated (Sea snake, viper)
5) **Serum electrolyte:** Hyperkalemia, Rhabdomyolysis (Sea snake)
6) **Blood grouping and Rh typing**

Syndromic approach

- **Syndrome 1;** Local Swelling, Bleeding disorder viperidae (all species)
- **Syndrome 2;** Local Swelling, bleeding disorder, shock, renal failure (pit viper, Russell`s viper)
- **Syndrome 3**; Local swelling, ptosis external opthalmoplegia, facial weakness (cobra)
- **Syndrome 4;** Not local swelling, ?no fang marks bitten on land while sleeping indoors, ptosis external opthalmoplegia, facial weakness krait
- **Syndrome 5;** Dark brown urine, Renal failure, paralysis, bitten on land (Russell`s viper)

Rx: **Date:** **Time:**

- **Maintain:** Airway, breathing, circulation
- **O_2 inhalation** stat and SOS
- **Diet;** NPO (No per oral)
- **Inf. NS IL** + IL 5% Dextrose saline IV@40drops/min
- **Inj. Tetanus toxoid (TT)** IM stat
- **Inj. Co-Amoxiclave 1.5gm (Augmentin)** IV stat and TDS
- **Inj. Omeprazole 40mg (Risek) IV stat**

Anti-Snake Venom (Polyvalent ASV):

- **Inj. ASV 10 vial + inf. 100ml** NS or 100ml Dextrose saline IV @ 60drops/min
- Closely observe at least 1hour for side effect

Patient with Neurotoxicity:

- **Inj. Atropine 0.6mg/ml** IV stat
- **Inj. Neostigmine** 0.02mg/kg IV or **Inj Edroponium** 10mg IV

if Objective improvement is not seen after 5 min then Repeat Neostigmine at 0.5mg every 30 minutes as needed with
Atropine 0.6mg IV contnious infusion over 8 hours

If Neurotoxicity with Respiratory failure

Artificial Ventilation in ICU

If Patient is in Shock:

1) **Inj. Hydrocortisone 250mg (Hyzonate)** IV stat and OD
2) **Inf. NS 30ml/Kg IV** @50drops/min
3) **Inj. Noradrenaline** 1 amp in 1L NS IV initial; 8-12 mcg/min : titer to effect Maintenance dose; 2-4 mcg/min

If Elevated PT/INR:

- Fresh Frozen plasma (FFP): 15ml/kg

If DIC:

- Cryoprecipitate; 10 -15 unit (or 1 – 2 bags cryoprecipitate/10kg)

If Renal failure; Dialysis

Indication of Polyvalent Anti-Snake Venom (ASV):

- Fang mark, fast spreading local swelling, tender node
- Hemostatic abnormalities (20 min whole blood clothing, PT) ,Bleeding manifestations
- Oliguria Red urine – elevated creatinine
- Hypotension, shock, arrhythmias
- Elevated Creatinine kinase CK, potassium (Rhabdomyolysis)
- Acute Renal failure not due to sea snake bite

Anti-snake venom Adverse Effect: Early anaphylaxis (occur within 10-18min)
Angioedema, hypotension, Shock, Dyspnea, itching, fever

Treatment of side effects:

✓ Stop ASV infusion temporary
✓ **Inj. Adrenaline 1mg /ml** (1:1000 solution)
0.5ml IM Stat (intra gluteal) and repeat after 5-10min if needed
(0.5mg for adult and 0.01mg/kg weight children)
✓ **Adrenaline or salbutamol Nebulization**
✓ **Inj. Hydrocortisone (Hyzonate)** 100mg 1 vial IV stat (children 2mg /kg dose)
✓ **Inj. Pheniramine 22.7mg/ml (Avil)** 2 vial IV stat

Criteria for repeating dose Anti-Snake Venom (ASV) :

❖ If blood remain incoagulabe (20 min whole blood clothing, PT) after 6 hour of Antivenom tretament
(The time taken for liver to restore coagulation factor 6 hours)
❖ If patient continue to bleed
❖ in case of no improment or detiorating neurotoxicity or cardiovascular sign
1-2 hours after completion of anti-snake venom (ASV)

NOTE: Maximum dose of ASV upper limit ; 25-30 vial

Rx on discharge

- **Tab Co-amoxiclave 625mg (Augmentin)** TDS for 7 days
- **Tab Serratiopeptidase (Danzen DS) 10mg** TDS for 5 days
- **Cap Esomeprazole 40mg (Ezomol, Nexum)** OD before breakfast for 14 days

Remember:

- Most tradional First aid methods should be discourage
- Avoid –cutting, squeezing Electric current etc.
- Tight (arterial) tourniquets are not recommended.

RABIES

Belong to genus lyssavirus in the family Rhabdoviridae
Reservoirs: Foxes, Raccoons, Wolves, Bats, dogs, Infection: mainly occur due to rabid dog's bite
Incubation period: usually 1-3 months but in rare cases is as short as 2 weeks or > 1year.

Chief Complaint:

- Prodromal Stage (1-10 days):
  Fever, headache, Malaise, Myalgia anorexia, vomiting, paresthesia around the bite.
  - Acute Encephalitis state;
    Excitation, agitation, confusion, seizures, focal deficits these symptoms are inter speared by lucid periods
  - Brain Stem Dysfunction;
    Cranial nerve palsies, diplopia, optic neuritis
    Patient develop photophobia & hydrophobia
  - Death
- Dumb Rabies: Rarely patient will not show any features of irritability and may develop flaccid paralysis (GBS). This mainly occur in vampire bite.

Histroy of animal bite

O/E: (Pulse, BP. Spo2%, Temp), GCS

- CNS and wound examination

Investigation: not usually done but if neeed then

1) **CSF:** Mild mononuclear cell pleocytosis with mildly ↑protein
2) RBS, CBC, MRI brain

Rx: Date: Time:

- Local wound cleaning with soap & water for at least 30 mins
- A veridical agent povidone -iodine should be used for washing

Tetanus toxoid(TT) injection + oral antibiotic
Passive immunization: Anti rabies immunoglobulin
Passive immunization: Rabies human monoclonal antibody
Active immunization: Anti Rabies Vaccine

1. Inj. Human Rabies immunoglobulin (HRIG)
   20 IU/kg (40 IU/kg of body weight for heterologous (equine) immunoglobulin)
   Infused at the site of bite any remaining (HRIG) after infiltration of bite site should be administered IM at a distant site.
2. Inj. Anti-Rabies vaccine (ARV)
   (Purified Vero rabies vaccine)
   1ml IM five doses (0,3,7,14,28) IM (deltoid only/outer aspect of thigh in young children)
   1st dose; Day 0 **2ND dose:** Day 3
   3rd dose: Day 7 **4th dose:** Day14
   5th dose: Day28 **6th dose:** Day 90 (Booster dose)

Pregnancy is not contraindication
Tab Co-Amoxiclave (Augmentin) 625mg
1+1+1 for 5 day

Points regarding HRIG:

- HRIG administered only once, preferably with in 24 hours after exposure (on day 0 along with ARV vaccine

If HRIG was not administered when ARU was begun, it can be administered up to 7th day after 1st dose of ARV but Beyond the 7th day (after 3 doses of ARU has been administered) HRIG is not indicated

WHO categories of contact(with suspected rabid animal)/recommended post exposure prophylaxis (PEP)		
Categories	Post exposure prophylaxis (PEP) measures	
Category I	Touching or deeding animals' licks on intact skin	None
Category II	Nibbling of uncovered skin, minor scratches or abrasions without bleeding	Immediate vaccination and local treatment of the wound
Category III	Single or multiple transdermal bites or scratches licks on broken skin contamination of mucous membrane with saliva form licks contacts with bats	Immediate vaccination & administration of rabies immunoglobulin, local tretament of the wound

PARACETAMOL OVERDOSE

Most common overdose, Normal therapeutic dose upto 4000mg every 24 hours

Chief Complaint:

Stage 1 (24 hours)

- Nausea, vomiting, abdominal pain, arrhythmia, sweating, pale (normal LFT)

Stage 2 (1—3 DAYS)

- Liver injury develops, upper right Quadrant pain. (Rise LFT)

Stage 3 (3—5 DAYS)

- Hepatotoxicity peaks, Rapid and severe hepatic encephalopathy, hypoglycemia, glucose, lactate, phosphate abnormality, bleeding manifestation, portal hypertension, oliguria.

Stage 4 (5—8 days)

- Hepatic failure and death or complete resolution who's survives stage 3

H/O OF PARACETAMOL INGESTION;

Fatal dose : 12 g or 150mg/kg body weight

O/E: Vitals, JACKLET, Bradycardia, arrhythmia

- Skin condition: Bleeding spot

Investigation:

7) LFT (SGPT,SGOT) and Serum bilirubin
8) PT/INR, CBC, RBS , RFT
9) Serum Electrolyte, Serum Amylase
10) Toxicology screen
11) Serum Paracetamol level (PCM) level is the basis for Diagnosis
12) ECG (to access arrhythmia)

FACTORS AFFECTING TOXICITY;

- Excessive intake of Paracetamol.
- Excessive Cyto P 450 activity.
- Chronic alcoholics/AIDS.
- Patient with concurrent Phenobarbitone
- ATT therapy/Herbal products.
- Gilbert's syndrome and Malnutrition.

Rx: **Date:** **Time:**

- **Maintain ABC** (airway, breathing, circulation)
- **O2 inhalation** via Face mask 6L/min
- **Gastric lavage:** If patient present within 1-2 hour Activated charcoal: 1g/kg in all patient who present within 4 hours of ingestion

Specific indication: N acetylcysteine (NAC)

N-acetylcysteine infusion Protocoal

24 hours IV Protocoal :

- **Inf. 5% Dextrose Saline 200ml PLUS**
  Inj. N-acetylcysteine 150mg/kg slowly IV Over 15 to 60 minutes **THEN**

  Inf. 5% dextrose saline 500ml+ Inj. N-acetylcysteine 50mg/kg IV @ 10drops/min (or over 4 hours) **THEN**

  Inf. 5% dextrose saline 1L+ Inj. N-acetylcysteine 100mg/kg IV @ 20microdrops/min(or over 16 hours)
- **Inf. dextrose saline** 1L+**Inf NS** 1L IV @ 40 drops/min

ORAL 72 hour Protocoal;

- Loading dose: 140mg/kg per oral
- Maintenance dose: 4 hr after loading dose, start 70mg/kg per oral every hrs. repeat dose if emesis occur within 1 hr of administration

IF IV NAC not available then:

- **Acetylcysteine sachet 200mg (Mucolator sachet)** 1+1+1 (one sachet TDS) **OR**
- **Tab Acetylcysteine 600mg** 140mg/kg stat and 70mg/kg every 4 hours (total of 17 doses) **OR**
- **Methionine 2.5gm stat** and 2.5 gm 4 hourly (total 4 doses, 10gm)

INDICATION OF NAC:

1) A suspected ingestion(>150mg/kg) in whom Serum Paracetamol level will not be available in the next 8 hours following ingestion
2) Patient with an unknown time of ingestion and serum Paracetamol level detected
3) Patient with h/o Paracetamol overdose with hepatic injury

DIGOXIN TOXICITY

DIGOXIN TOXICITY: Can occur with overdose or in renal failure patients

Chief Complaint:

- Anorexia, Nausea, vomiting, Somnolence, muscle weakness, diarrhea,
- Yellow vision (Xanthopsia)
- Neurological symptoms

Past history: Cardiac disease, renal diseases
Drug history (Digoxin)
O/E: Vitals, Hypotension, bradycardia
Investigation:

1) **Serum digoxin level:** >2.5 ng/ml
   Digoxin levels doesn't always correlate with toxicity severity. Because toxicity may occur at low levels also
2) **RBS:** To rule out hypoglycemia
3) **Serum Electrolyte** (look for K^+): Inhibition of Na-K ATPase pump both in heart & skeletal muscle leads to ↑ in extracellular K^+, thus hyperkalemia is in an important marker of toxicity & a predictor of mortality.
4) **Serum Magnesium** and **Serum calcium**
5) **Serum Creatinine** (to look for renal failure)
6) **ECG:** Dysrhythmia, Bradycardia.
   - ➢ Premature ventricular contraction are the most common. (Ectopics , Bigeminy)
   - ➢ Paroxysmal atrial tachycardia with 2:1 AV block, Atrial Fibrillation
   - ➢ Nodal rhythm, ventricular tachycardia
   - ➢ T wave inversion, PR interval increased
   - ➢ Sagging or "Scooped out" ST depression (it is digoxin effect, not a sign of toxicity)

Risk factors:
Hypokalemia, Hypomagnasemia, Hypercalcemia
Drug which decrease digoxin excretion (Quinine, verapamil, Amiodarone) & Renal failure

Rx: **Date:** **Time:**

- Maintain ABC(Airway, breathing, circulation)
- Pass two IV line, Stop digoxin

Activated charcoal : in patient having an acute digitalis intoxication who present to the emergency within 1-2 hours of ingestion
Gastric lavage with activated charcoal
dose: 1g/kg (maximum 50g)

- **Correct electrolyte imbalance if present**
- **Inj. Calcium gluconate 10% 10 ml** in 100 ml Normal saline IV over 10 min (in hyperkalemia)
- **Inf. NS IV** @ 50drops/min

If Hypotension Persist after fluid therapy or Shock then can give norphine/epinephrine
For Ventricular tachyarrhythmia's

- **Inj. Lignocaine 20mg/ml (Lidocaine)**
  1 to 1.5mg/kg IV bolus over 2-3 minutes
  repeat if needed 0.5-0.75mg/kg

For Bradyarrhythmias : **Inj. Atropine 0.6mg** 0.5 to 1mg or 0.04mg/kg IV every 5 mins (no > 3mg)
Unstable Patient/tachyarrhythmia's (SVT):
Electrical Cardioversion: Use lowest energy if needed;
Start at 10-20 J & increase 10-20 J increment
Digoxin Antibodies (Digi fab): Indicated in chronic digoxin toxicity (dysrhythmias, serum K^+ > 5.5, low GCS),
Acute digoxin ingestion > 10mg in adults & > 4mg in (or 0.1mg/kg) in children
Dose: (1amp or 40mg binds 0.5mg digoxin)
Acute toxicity: 5 vial (repeat if needed)
Chronic toxicity: 3-6 vials for adults
In Cardiac arrest: Resuscitation efforts should be continue for at least 30 minutes after giving digoxin antibody (Digifab)

METHANOL (MeOH) Poisoning (methyl Alcohol)

Definition: This occur in Industrial spirit" Poisoning historically called wood alcohol and is common component of many Solvents, windshield washer fluid, and Paint removers

Chief Complaint:

Lethal dose 30-50ml (0.5ml/kg)

- Blindness - as little as 10ml
- Metabolic acidosis, Bradycardia, Shock
- Eye-Clouding, diminished vision dancing and flashing spots, dilated or fixed pupils, hyperemia of optic disks, papilledema, and blindness (Snowfield blindness)
- with Severe Poisoning; Myocardial infarction, Shock

O/E: Vitals , JACKLET, GCS

INVESTIGATION:

1) **ABG:** High anion gap acidosis.
2) **Elevated osmolar gap.** Osmolar gap > 10 mmol/L
3) **Serum Methanol level, ethanol level**
   Methanol Concentration >25mg/dl
   Ethylene glycol level > 20mg/dl
4) **Methemoglobin level** (if there is Cyanosis following the ingestion of anti-freeze, which may contain nitrate.
5) Lactate gap, Ethylene glycol.
6) Calcium oxalate crystals in urine.

Indication for Ethanol or Fomepizole

- Methanol Concentration > 6mmol/2 (20mg/dL) anion-gap acidosis, visual symptom
- Ethane or Fomepigate should be Continue until methanol level falls <3 mmol/L (10mg/dl).

Rx: Date: Time:

- **Maintain ABC** (airway, breathing, circulation)
- Do not induce emesis
- **If present < 1 hour after ingestion:** Gastric Lavage (Aspiration) with activated charcoal
- **IV Folinic acid (leucovorin),** 1mg/kg (Max 50mg), followed by folinic acid 1mg/kg IV every 4 hour for 6 doses
- **Ethanol**-loading dose 10 ml/kg of 10% ethanol + Inf. Dextrose 5% 100ml IV Over 30 mints (or give P/O /NG) then Infusion

In Moderate: 1ml/kg/hour

- Fomepizole (15mg/kg) + inf. Dextrose 5% 100ml IV over 30 min followed by to 10mg/kg IV 12 hourly for four doses. Continue until methanol concentration < 20mg/dL
- **For Acidosis:** Inj. Na bicarbonate IV slowly

Hemodialysis - Enhance elimination of methanol and formic acid.

Indication-

- Methanol level grater 15 mmol/L
- Metabolic acidosis not recover with Na bicarb.
- Visual symptoms · lack of clinical improvement

And Methanol associated Optic Neuropathy

- Recombinant human Epo IV
  20,000 units/day for 3 successive day

PARAQUAT POISONING (PQ)

Definition: Herbicides inside human cell it undergoes redox cycling a byproduct of this process superoxide radical, which produce direct cellular injury. Redox cycling consumes NADPH, one of the cell's key antioxidant defenses.

Chief complaint:

- Painful mouth, dysphagia, nausea, vomiting abdominal pain, necrosis, inflammation or ulceration of mouth and pharynx
- Symptom of acute renal injury
- Lethal dose; > 30ml (a mouthful or two) of 20 to 24 % paraquat concentration is lethal.
- Hx of kidney disease and age over 50 years have been linked to worse outcomes.

O/E: Vitals (BP, pulse, spo2 %, temp)

- Dyspnea, tachypnea, Hypovolemia
- B/L crepitation (if lung involved)

Investigation:

1) **Urine paraquat;** (quantities conformation)
2) **Serum electrolyte, RFTS, Chest X-Ray**
3) **ABG:** (Blood Gas) & Arterial lactate

Rx: Date: Time:

- Maintain Airway, breathing, circulation).
- **O2 inhalation** if SP02 % < 90 % on room air
- **Pass NG tube**
- **Active charcoal** (1g/kg max dose of 50g) in NS and does gastric lavage.
- **If renal failure** then with charcoal hemoperfusions all do intermittent hemodialysis
- **Inj. Dexamethasone 8mg (Dexa)** IV TDS (to prevent lung fibrosis)
- **Anti-oxidant therapy** N-acetylcysteine infusion continuously

Note: Diquat is related herbicide that is often formulated with paraquat C/F and management is same as that of paraquat poisoning.

DATURA TOXICITY

Toxicity occurs because of the presence of up to 28 belladonna alkaloids, predominated by atropine and scopolamine. All parts of datura plant are poisonous and aphrodisiac. Mode of toxicity suicidal, hallucinogenic use

Chief complaint: Symptoms: start within 60 mint last for 48 hours.

- Anti-cholinergic symptoms; Mydriasis, dry mouth tachycardia
- Fever and erythema
- Rhabdomyolysis and Acute kidney injury
- CNS effect; Agitation, combative, confused

O/E: Vitals, GCS

- Febrile , confused, pupi; dilated

Investigation:

ECG, RBS, Serum electrolyte, RFTS

Rx: Date: Time:

- **Maintain Airway, Breathing, Circulation**
- Management is mainly supportive
- **Gastric lavage** with activated charcoal
- **Inj. Physostigmine IV** 0.5 to 2 mg at a rate of no more than 1 mg /minute repeat dose if needed
  Children should receive 0.02 mg/kg IV & rate should not exceed from 0.5 mg /minute **OR**
- **Inj. Neostigmine** IV 0.5-2 mg/ kg
  (Children 0.025 -- 0.08 mg/ kg)
- **For Agitation:** Inj. Diazepam (Valium) 10mg IV stat, SOS
- **Inj. NS IL** IV @30 drops /min

RODENTICIDE (Zinc phosphide, Aluminum Phosphide)

Zinc Phosphide: Direct ingestion of > 500mg usually result in death.
Aluminum phosphide: Fatal dose on exposed pellet is 150- 500mg. After ingestion it converted into phosphine gas which produce various toxic effects. Minimum Lethal dose; 1mg/kg

Chief Complaint: Clinical manifestation develops within 30 mins of ingestion.

- Circulatory collapse, hypotension, shock myocarditis, Pericarditis, acute pulmonary edema, and Cogensted heart failure
- Ingestion of fresh phosphide in the original Packaging is more dangerous

C/F for white phosphorus are!

- Perioral, mucosal, and skin burn.
- Vomiting, diarrhea, garlic odor in breath
- Phosphorescent emesis or Stool, delayed liver failure, Acute kidney injury, lung irritation

O/E: Vitals(Pulse, BP, SPO2%, Temp) GCS

Investigation:

1) ECG (bed side) & RBS, Serum electrolyte
2) RFTS, LFTS, Coagulation profile

Rx: Date: Time:

- **Maintain ABC** (Airway, Breathing, Circulation)
- **Give activated charcoal** to prevent further absorption of ingested toxin (lavage with olive oil)

If patient present within few hours of ingestion Gastric lavage using Potassium permanganate in 1:10000 dilution.
Treat hypocalcemia and hyperkalemia (See electrolyte imbalance Portion) **in yellow phosphorous.**
Treat hypomagnesemia in zinc phosphide

- **Inj. Esomeprazole 40mg (Ezomol, Nexum)** 1 vial stat and OD
- **Inj. $MgSO_4$ 1g** IV followed by 1g for the next 2 hours & 1 to 1.5g after every 4-6 hrs for 3-5 days
- **Inj. vit-k 10mg** 1 vial IV stat
- **Fresh frozen plasma** transfusion may be needed.

SCORPION STING

Scorpion sting is an acute life-threatening, time limiting emergency of villagers

Chief Complaint:

Autonomic storm: Alpha-receptor Stimulation

- Vomiting, Salivation, sweating, priapism & bradycardia are early diagnostic signs
- Tachycardia, hypertension, myocardial dysfunction pulmonary edema, shock
- Hypotension and bradycardia can be encountered within 1 – 2 hours of sting due to cholinergic stimulation
- Pulmonary edema may develop within 30mins to 3hours after a sting
- Severe pain: at the site of sting
- Systemic inflammatory response like syndrome is triggered during envenomation by some species

Anaphylaxis from sting possible(very rare)

O/E: vitals , GCS

Investigation:

1) CBC, RBS, RFTs, LFTs and
2) Serum Amylase, S.electrolyte, PT/INR, aPTT

Rx: Date: Time:

- **Maintain ABC** (Airway, breathing, Circulation)
- **O_2 inhalation** stat and SOS

For pain: Local ice packs, Xylocaine, NSAID(any)

Tab Naproxen(Synflex) 500mg 1+1

If pulmonary edema then:

Inj. Furosemide 40mg (Lasix) IV , can repeat

If Hypotensive:

Inf. NS 2L IV@260drops/min (or 30ml/kg)

For Autonomic Storm; Prazosin

Tab prazosin 1mg, 2mg (as scored)
(30mg/Kg/dose) Repeat the same dose at the end of 3 hours if clinical features persist.

- **Inj. Omeprazole 40mg (Risek)** 1vial IV stat,SOS

Anti-Scorpion Venom: not available in Pakistan

- **Inj. Scorpion venom** 20ml vial with 10ml dilute IV stat slowly.
- **Inj. Dexamethasone (Dexa)** 1.5cc IV Stat

If patient is in shock; **Treat as Anaphylactic shock**

TETANUS

Definition: Caused by clostridium tetani, the spores of C. tetani contaminate the wound it produces exotoxin-tetanospasm which block the release of inhibitory neurotransmitter 'GABA' this leads to increased activity of Alpha motor neuron producing rigidity. Tetanus toxin induce effects on anterior horn cells, brainstem & autonomic neurons are long lasting (4 to 6 weeks) because recovery requires the growth of new axonal nerve terminals.

Chief complaints:

- Increase muscle tone generalize muscle spasm can lead to the following
- Neck stiffness, Trismus (lock jaw)
- Opisthotonos: contraction of back muscle produce arched back
- Risus sardonicus (Sardonic smile) sustained contraction of facial muscle (frontalis and angle of the mouth) result in grimace
- A board-like rigid abdomen
- Periods of apnea and/or lower upper airway obstruction due to vise-like contraction of the thoracic muscle and/or glottal or pharyngeal muscle contraction respectively.
- Increase tone in masseter (trismus-lock jaw)
- Dysphagia due to laryngospasm
- **Past Hx of wound.**

O/E: Vital (Pulse, BP, Spo2%, Temp) GCS

Investigation:

1) **RBS, LFTS, RFTS, Serum electrolyte.**
2) **Spatula test:** Touching the Post pharyngeal wall with a sterile, soft-tipped instrument, a positive test is the involuntary contraction of jaws (biting down on the "spatula")

TRIGGERS:

Loud noise, physical contact or light since patient is fully conscious, both the tonic contraction and spasms are intensely painful.

Pedisposing factors:

- Contaminated wound (in non-immunized patient), patient with dental infection
- Obstetric patient (after septic abortions).
- Neonates (infection of the umbilical stump).
- Post-surgical patient.
- Diabetic patient with infected extremity ulcers.
- IV Drug user or inject contaminated drugs

Rx: **Date:** **Time:**

- **Maintain** Airway, Breathing, Circulation
- ET intubation or Tracheostomy may needed.
- **Diet:** Early nutritional support is mandatory
- **Admit in ICU**
- **Inj. Diazepam (Valium) 10mg/2ml**
  IV stat (10 to 30 mg starting dose) and TDS up to maximum of 500 mg/day may be required.
- **Inf. Metronidazole 400mg (Flagyl)**
  IV Stat and QID (can also give tablet per oral)

(Alternate to metronidazole is Doxycycline, Clindamycin)

- **Inj Benzyl penicillin 1.2gm** IV QID (ATD) 10days
- If mixed infection is suspected then
  Inj. Ceftriaxone 2 mg (Oxidil, Rocephin) after test dose 1 vial IV BD
- **Inj. Omeprazole 40 mg (Ruling) IV Stat & OD**
- **Inj. Anti tetanus Human immunoglobulin (Inj. Tetuman) 3000 to 6000 IU** (250 IU/Vial) IM Stat within the first 24 hours presentation

Active Immunization

- **Inj Tetanus Toxoid (TT)** IM
  - 1st and 2nd dose 4 to 8 weeks apart
  - 3rd dose 12 months after 2nd dose
  - Booster dose every 5 year

If Patient have Autonomic instability

- Inj magnesium sulphate IV (5g or 75mg/kg), followed by continuous @ 2-3 g/hr
- Inj Labetalol IV (0.25-1.0mg/min infusion)
- Inj. Morphine (0.5 to 1.0 mg/kg/hour IV inf)

Note:

1) High dose diazepam cause lactic acidosis so instead of high dose if needed we can use
Inj Midazolam (Dormicum) IV continuous infusion
2) if diazepam/midazolam alone is not enough for sedation then we can use Inj. Rocuronium IV bolus Dose 0.6--1 mg /kg, Continous IV@10 µg/kg/min

TRICYCLIC ANTIDEPRESSANT POISONING

Chief Complaint;

- Dry mouth, sedation, hallucination
- Urinary retention, jerky movement, drownsiness
- Arrhythmias; Wide complex tachycardia
- History of taking TCA; doe and time

O/E;

- Vitals, general examination
- Pulse; Arrythmias , **BP;** Hypotension
- **Temperature;** Hypothermia
- **Pupil;** Dilated
- **Chest;** crepitation; +/-

Investigation;

1) **Serum electrolyte;** Hypokalemia
2) **ABGs;** Acidosis
3) **Serial ECGs**

Indication Hospital observation; ingestion >5mg/kg

Life threatning ; ingestion 10-20mg/kg

RX ; DATE; TIME;

- **Maintain Airway, breathing, circulation**
- Gastric lavalge, Pass IV line
- **O2 inhalation stat and sos**
- **Inf NS 1L IV @15drops/min**
- **Inj Sodium bicarbonate** 8.4% solution (50mEq) (1mEq= 1ml) 1-2mEq/kg every 5 minutes Till normalization of BP, Narrow QRS, PH become 7.45-7.55

IF Hypotension;

- **Inf NS 1L IV** @25drops/min—continous

If not covering with IV fluid then start

- **Inj norphine 2amp** in 500ml NS IV @10drops/min

If Seizures occur;

- **Inj Diazepam 10mg/2ml (Valium)** 1ml or 5mg IV stat and SOS

KEROSENE OIL POISONING

Chief complaint;

- Burning sensation of mouth, and throught
- Fever, nausea, vomiting, abdominal pain
- Diarrhea, cough, Convulsion, coma
- History of Kerosene oil ingestion

O/E;

- Vitals, general examination
- Pulse; Tachycardia
- RR; Tachypnoea,
- Temp; Fever

CHEST; Creps/Rochi; +

Investigation;

1) **CBC with ESR;** Leukocytosis
2) **Chest X-Rays;** PA view
   - **Grade 0;** normal
   - **Grade 1;** minimal unilateral Perihilar infiltration
   - **Grade 2;** bilateral infiltration
   - **Grade 3;** confluent fluffy shadow on one or both sides
   - **Grade 4;** extensive B/L infiltration with consolidation and/or pleural effusion

RX ; DATE; TIME;

- **Maintain Airway, breathing, circulation**

NOTE; **Stomsch wah and suction are contraindicated**

- **Removal of contaminated clothes**
- **O2 Inhalation; if needed**
- **Inf NS 1L** + Inf DS 1L IV @30drops/min
- **Inj omeprazole 40mg** (Teph) IV and OD
- **Inj Hydrocortisone** (Hyzonate) 250mg **IV stat and TDS**
- **Inj Ceftriaxone 1gm** (oxidil, Rocephin) **1 vial BD** (After test dose)
- **Inj Metronidazole** (Flagyl) 100ml **IV stat and TDS**

IN CHILDRENS;

- **Inj RL IV @30ml/kg**
- Inj Ceftriaxone 500mg (oxidil, Rocephin) 100-200mg/kg in 2 divided dpses or BD
- **Inj Hydrocortisone (Hyzonate) 250mg** IV 3-4mg/kg 6 hourly

If CNS manifestation; e.g, irritability, convulsion;

- Inj Diazepam (Valium) 0.5mg/kg IV stat

Treatment of complication; if any

Wait and Watch therpy

Electrolyte Imbalance

HYPOCALCEMIA

Definition: Serum calcium < 8.7mg/dL (when serum albumin is normal)

Normal Calcium: 8.8 to 10.7mg/dL (depend on lab to lab so it may varies)

Chief complaint: (CAT SAT)

C: Convulsion **A:** Alter behavior

T: Tingling & numbness around mouth, hands, feet

S: Stridor & Convulsions (laryngeal spasm)

A: Arrhythmia's. **T:** Tetany-Carpopedal Spasm

Past HX: Kidney disease, liver disease, thyroid surgery, abdominal pain, diet low in calcium.

O/E:

Vitals (BP, Pulse, Spo2, Temp)

Trousseaus sign: Inflating sphygmomanometer cuff on the upper arm more that systolic pressure, will produce carpal spasm.

Chvostek sign: Tapping over the branches of facial nerve produce twitching of facial muscles

Investigation:

1) **Serum Calcium:** low (< 8.7mg/dL)
2) **Serum Creatinine, Serum Electrolyte**
3) **Serum Albumin** (calculate corrected ca level)
4) **ECG:** QT prolongation , ventricular arrythmias
5) **Serum PTH** (To rule out hypoparathyroidism)
6) **Serum Phosphate**
7) **Blood vit D level:** (decrease vit D production or action may cause hypocalcemia with high PTH)
8) **Serum magnesium:** (hypomagnesemia cause resistance to the effect of PTH)
9) **ABG** (to rule out alkalosis; mostly respiratory)
10) **Serum Amylase:** (to rule out acute pancreatitis)

Corrected Calcium (In Hypoalbuminemia):

= [serum calcium] + [(4 - serum albumin) x 0.8)]

e.g patient have S.calcium 8.9 & S.albumin 1.8

= 8.9 + [4-1.8 x 0.8] = 8.9 +1.79 = 10.66

Causes:

Hypoalbuminemia(Pseudohypocalcemia), Alkalosis, Chronic renal failure, vit D deficiency, hypoparathyroidism, Pseudohypoparathyroidism, Acute pancreatitis & hypomagnesemia

Rx: Date: Time:

- Diet: calcium containing diet

1) **If Patient is symptomatic or has significantly prolonged QT interval then**

- **Inj. Calcium gluconate 10% 1gm / 10ml**

1 amp IV slowly over 20 mints state **then**

Inj. Calcium gluconate 10% 1gm /10ml 8 amp (8gm) + IL NS (or IL 5% dextrose saline) IV @ 10 drops / min

- ➢ Maintain calcium between 8 to 9 mg/dL
- ➢ Check serum calcium: every 4 hours

- **Tab calcium carbonate + vit D (Qalsium D)**

1+0+1

2) If Hypomagnesaemia is present then

- Inj $Msgo_4$ 4% 100ml IV @ 20 drops / min state (1 to 2 gram every 6 hours) and then TDS
- For long-term replacement
  Tab magnesium oxide 400mg BD

3) If vit D deficiency is present:

Vit D analogs alfacidol, calcitriol (60000 IU/week)

- **Vit D 3 injection (D-Tress, Indrop D)**
  1amp in half glass of milk once weekly
- **Tab Alfacidol 0.5mcg (Osteo-D, Adela)**
  1+0+1

4) Correction of albumin deficiency if present

5) **Most patient with hyperparathyroidism:** require life-long calcium & vit D supplementation

6) **Hyper ventilation induced tetany if present:** Rebreathing mask (or breath in and out into a simple plastic cover) to correct respiratory alkalosis

Summary of Treatment :

- Inj. calcium gluconate 10% 10 ml in 100ml pladyx IV Over 10 mins. Repeat if needed
- Tab calcium carbonate + vit D (Qalsan D) BD
- Vit D tablet or injection (inj D-Tress, Indrop d)

HYPERCALCEMIA

Definition: Serum calcium >10.2 mg/dL (with normal serum albumin). Among all causes of hypercalcemia, primary hyperparathyroidism & malignancy are the most common (90%)

Chief Complaint: (bone, stone, growns, moan)

- Asymptomatic in many patients
- **Bone**: Osteopenia, fractures, bone pain
- **Kidney**: Polyuria, nephrolithiasis, Renal failure
- **GIT**: Abdominal pain, anorexia, vomiting, constipation, pancreatitis
- **Nervous system**: Weakness, confusion, irritability, stupor, coma
- **Heart**: Arrhythmias (ECG short QT interval)
- **Drug Hx:** glucocorticoids, thiazide diuretics

O/E: Vitals: (Pulse, BP, Spo2%, Temp)

Investigation:

1) **Serum Ca^{++}** (check corrected Calcium)
2) **ECG:** Shortening of QT interval
   OS born (J) wave (Severe Case), Ventricular irritability and VF (extreme case)
3) **Serum electrolyte , RBS, CBC with ESR**
4) **X-Ray and USG KUB** for renal stones

OTHERS:

A) Serum PTH and Urinary calcium

- If PTH is normal or elevated with Elevated urinary Calcium = Hyperparathyroidism

Low urinary Ca^{++} = FHH Screen family members

- PTH is low (<20pg/ml) with hypercalcemia: suspect malignancy PTH related peptide
- CXR, Bone scan, myeloma workup

B) Serum phosphate

$\downarrow PO_4^-$ +↑ALP = primary hyperparathyroidism

$\uparrow PO_4^-$ +↑ALP + renal impairment = Tertiary hyperparathyroidism

C) Serum vit D3

Causes: remember "CHIMPANZES"

Calcium excess (over supplementation)
Hyperparathyroidism , **I**mmobilization, **MM**, **M**ilk alkali syndrome **P**arathyroid adenoma, **A**luminum intoxication, **N**eoplasms, **Z**ollinger Elisson syndrome, **E**xcessive Vit D/A intake , **S**arcoidosis

Rx: **Date:** **Time:**

- Diet : Low in calcium

No immediate interventions if:

1)Asymptomatic or mildly symptomatic patient with serum calcium <12mg/dL

2) Asymptomatic or mildly symptomatic patient with chronic moderate hypercalcemia (Calcium b/w 12 & 14mg/dL)

If Severe : Ca^{++} > 14 mg/dL & symptomatic:

- Rehydration (10L/day) + diuretics

Inf. N/S (0.9%) IV @50-75drops/min (200-300mL/hr) Then @25drops/min (or adjusted to maintain the urine output at 100 to 150 mL/hr)

Inj. Furosemide 40mg (Lasix)

IV 80-100mg every 1-2hr (2 to 3 shots)

Bisphosphonate (zoledronic acid)

Inj. Zoledronic Acid 4mg/100ml (Edonax, zoldro) IV @ 50drops/min OR over 15-30 mins

Steroids: in Hypercalcemia due to malignances

Inj. Hydrocortisone (Hyzonate) 100,250mg IV 100 to 300 mg daily **OR**

Tab prednisolone 5mg (deltacortil) 1-2mg/kg for 3-7 days

If Severe symptomatic hypercalcemia refractory to Zoledronic acid then

- **Inj. Denosumab 60mg/ml**

1amp SC & then repeat base on response

Dialysis: Hypercalcemia not responding to routine treatment (i.e Malignancies) , severe hypercalcemia (>16mg/dL) and heart failure or renal failure preventing aggressive hydration

Note:

1)Alternate to zolendronic acid are Pamidronate (60-90mg IV Over 2-4 hours) Etidronate;7.5mg/kg/day 3-7 consecutive day)

2) Salmon calcitonin infusion 4-8 IU/kg IM 6^{th} hourly (IM OR SC)

HYPOKALEMIA

Definition: Serum Potassium (K^+) < 3.5mEq/L (normal 3.5 to 5 mEq/L). Mild hypokalemia: K^+; 3-3.5mEq/L
Moderate hypokalemia : Serum K^+ < 3.0mEq/L, severe hypokalemia: serum K^+ <2.5mEq/L

Chief Complaint: (Moderate/severe hypokalemia)

- Fatigue, myalgia, muscle weakness
- Flaccid paralysis, Areflexia (K^+<2.5mEq/L) weakness usually begin in lower extremities, progress to the trunk & upper extremities
- In severe case (K^+<2.5mEq/L) Muscle cramps, Rhabdomyolysis, myoglobinuria.
- Paralytic ileus, constipation, urinary retention
- Polyuria, polydipsia & Diuretic history

O/E: Vitals: (Pulse, BP, Spo2%, Temp), JACKLET

- Check reflexes

Investigation:

1) Serum electrolyte (K^+ < 3.5mEq/L)
2) **ECG:**
   - Cardiac arrhythmia (if patient with Digoxin)
   - P wave: Increase width and amplitude
   - Prolongation of PR interval
   - T wave: flattening and inversion ST depression
   - U wave: (best seen in V2,V3,V4)
   - Apparent long QT interval
3) **Urine Potassium** (exclude renal & extrarenal causes)
4) **Plasma calcium, magnesium** AND **ABG**

Calculate Potassium deficit: Roughly 1 mEq/L fall in serum K^+ =300 mEq/L total body potassium deficit

Monitor: serum electrolyte (k^+) every 1-3 hours

Can also prescribe K^+ sparing diuretics

- Tab Aldactone 25-50mg OD/BD
- Tab Eplerenone 25-50mg OD/BD

Rx: **Date:** **Time:**

- **Maintain;** Airway, breathing, circulation
- **Diet:** potassium rich food (fruit juice, coconut water) & low sodium diet

Mild to moderate (K^+ 2.5 to 3.5 mEq/L)

- **Tab KCL (potassium Bloride) 500mg**
  2+2+2 (brand name : Tab Neo-K) **OR**
- **Syrup Neo-K** 15ml (or 2TSF) in one glass of water TDS (15ml contain 20mEq postassium)
- **Cap Esomeprazole 40mg (Ezomol)**
  1+0+0 before breakfast
- **Tab Domperidone 10mg (Motilium)** 1+1+1

In severe case (K^+ <2.5mEq/L):

Above treatment + add

- **Inf IL NS + Inj. KCL 2 ampule**
  IV @ 75 drops/min (or over 4hours)
  (300ml/hr if want to deliver 15mEq/h
  200ml/hr if want to deliver 10 mEq/hr)
- Treat hypomagnesaemia (if present): as it is coexist with hypokalemia & causes renal posatssium loss
- Treat underlying cause

NOTE:

IV K^+ replacement dose: 10-15mEq/hour
1 ampule of KCL = 25 mEq K^+
Rate infusion 10-15 mEq/hour unless paralysis or malignant VT are present (here we give up to 40mEq/hour)

- Avoid glucose containing food or carbohydrates
- 150 to 200mEq of K^+ needed to raise K^+ level from 2mEq/L to 3.5mEq/L

HYPERKALEMIA

Definition: Serum potassium (K^+) > 5.5mEq/L (normal 3.5 to 5 mEq/L).

Chief Complaint

- Symptoms start as K^+ level of > 6.5mEq/L Muscle weakness, Hyporeflexia, paresthesia, Bradycardia (most striking C/F) cardiac arrhythmias, arrest, Respiratory failure
- K^+ > 8mEq/L : cause death (diastolic arrest)
- Renal failure + Bradycardia (Think about hyperkalemia

Past Hx: kidney disease, but

Drug Hx: ACE inhibitors: NSAID, K^+ sparing diuretics

On examination: Vitals

Investigation:

1) **Serum Electrolyte** (K^+ > 5.5 mEq/L)
2) **Serum Creatinine, RBS and ECG:**

Serum K^+	ECG changes
6-7 mEq/L	Tall, packed T wave
7-8 mEq/L	loss of P wave, widening QRS
8-10 mEq/L	Sine wave (widen QRS & merges with T waves)
> 9 mEq/L	Ventricular tachycardia, Atrial fibrillation, cardiac arrest

Rx: **Date:** **Time:**

- **Maintain;** Airway, breathing, circulation)
- **Diet:** Avoid potassium rich food
- **Inj. Calcium gluconate 10% 1gm/10ml** one amp in 100ml pladyx IV slowly over 10 minute stat & then OD for 5 days.
- **Salbutamol nebulization**

Salbutamol 20mg + 4 ml NS: By nebulization in 5-10min stat & Repeat once if necessary

- **Inf dextrose 25% 100ml + Inj Insulin R 10** units IV @ 20 drops/min stat & daily 5 days

✓ If hypoglycemia then only use dextrose

✓ If hyperglycemia then only use Insulin

- **Sodium or calcium polystyrene sulphate (K-Styrene sulphate sachet)** 15mg P/O TDS
- **Inj. Furosemide 20mg (Lasix)** 2amp IV stat

If Acidosis PH (7.30): then

- **Inj. Sodium bicarbonate 7.5mg/100ml** IV slowly over 20 min stat then TDS

Patiromer: In CKD with hyperkalemia

Dialysis: It not responding to above Treatment

SUMMARY TO TX:

ACTION	DRUG	DOSE	ONSET	DURATION
Membrane stabilization	CACLIUM GLUCONATE (drug of choice)Prevent cardia arrhythmia	10% 10ml IV over 10 min If require can repeat dose after 5 to 10 minute	Immediate	30-60 min
Shifters (Shift K into cell)	Insulin + dextrose infusion most effective treatment	25 or 50 % 100ml dextrose with 10 U insulin	15-30 min	4-6 hours
	Salbutamol (contra in IHD)	10-20 mg in 4 ml of NS by nebulization over 10 mins	30 min	4 hours
	Sodium bicarbonate	50 mEq IV over 5 minutes in cardiac arrest	5 min	1-2 hour
Excretion	Furosemide	80-100 mg IV	15 min	2-3 hours
K^+ binders	Sodium polystyrene sulphate	15-30 mg mixed with a glass of water) TDS	2-3 hour	4-4 hour

HYPONATERMIA

Definition: Defined as plasma sodium less than 135 mEq/L (Normal: 135-145 mEq/L)

1. True Hyponatremia; Plasma osmolality low (Hypo-osmolar Hyponatremia)
2. Pseudo Hyponatremia; plasma osmolality normal or high
   - Normal osmolality: Hyperlipidemia, Hyperproteinemia
   - High osmolality: Hyperglycemia (Plasma Na^+ can fall by 1.4mmol/L for every 100mg/dl rise in the plasma glucose concentration

Chief Complaint

- **Asymptomatic**

In Mild Hyponatremia (Na^+ 130-135mEq/L)

- Anorexia, headache, lethargy, Vomiting, Nausea

In Moderate Hyponatremia (Na^+ 125-129mEq/L)

- Personality changes, Ataxia, Confusion
- Muscle cramps, Muscle weakness

In Severe Hyponatremia (Na^+ < 124mEq/L)

- Drowsiness, Diminished reflexes
- Convulsion, coma, death
- More symptoms in acute than in chronic
- Symptoms more prominent in elderly patients
- Increase volume of ICF in brain cell which will lead to edema (neurological finding)

Past Hx; vomiting, diarrhea, renal disease, liver disease, malignancy (as part of SIADH), Diuretics

On examination: Vitals:

- GCS, Both plantar up in metabolic enceph

Investigation:

1) **Serum Electrolyte** (Na^+ < 135mEq/L)
2) **Plasma osmolality: (<270 mmol/kg)**

$$2 \times Na + \frac{Glucose(mg/dl)}{18} + \frac{BUN(mg/dl)}{2.8}$$

3) **Urine osmolality**
4) **RBS, RFT, LFT**
5) **Urine Na^+ concentration**
6) **If Hx of recurrent Hyponatremia;** then TSH (Hypothyroidism)
7) Drug Hx Addison & SIADH work up
8) **SIADH:** Urine Na^+, Creatinine, blood urea, RBS Urine acid (<4mg/μ), low plasma osmolality

Note: If there is doubt regarding duration of Hyponatremia, always treat it as chronic Hyponatremia. (Acute: < 48 hrs chronic: > 48 hrs)

Rx: **Date:** **Time:**

- **Diet:** Fluid restriction 500ml to 1L/day in euvolemic Hyponatremia (SIADH)

If developed rapidly (<48 hours) & sign of cerebral edema (seizures, confusion, altered sensorium) then

- **Inf. NS 3% 100 ml** IV @ 150 drops/min (or over 10 mins) (2ml/kg/hr) can be repeated once or twice depending neurological response and rise in plasma Na^{++}

If Mild to moderate symptoms

- **Inf. NS 3% IV @ 0.5-2ml/kg/hour**

If Hyponatremia with hypovolemia

- Inf. NS (0.9%) IV @ 20 drops/min

If Chronic asymptomatic Hyponatremia

Rate of correction: 8-12 mmol/L/day

Amount of Na^+ necessary= TBW (total body weight) x 10 with NS & Nacl tab / salt e.g. 70kg, Daily correction= 0.6 x 70 x 10 = 420mmol or 420mEq

- **Inf. NS (0.9%)** 2L IV @ 20 drops/min (154x2=308mmol)
- **Tab Nacl** 2+2+2 (According to need)

3% Saline (3% NS): In severe neurological Symptoms; Give 100ml 3% saline over 10-60 min (2ml/kg/hr up to max of 100ml), then 10 mins later, if symptomatic repeat until target 5 mEq/L

Rx of underlying cause:

IN Fluid (1L) - Solution	Na^+ mEq/L or mmol/L
7.5%. NaHCO3	900
3%, Nacl (NS)	513
0.9 Nacl (NS), DNS	154
0.45% Nacl (NS)	70
R/L(ringer lactate)	130
Isolyt M	40
5%. Dextrose	0

Calculation of excess Volume (to be removed)

Excess body H_2O = TBW x [1- (Current Na^+/140)]

TBW= Total body water

TBW=0.6 x Body weight (male)

TBW= 0.5x Body weight in kg (Female)

Sodium deficit

= (Desire Na^+ - Serum Na^+) x TBW

e-g 60 kg man, Na^+ level 115m mEq/L

= (135 - 115) 0.6 x 60 = 720 mmol/L

How to find Na^+ deficit

- 3% Saline needed for correction can be calculated as (for 24 hours Correction)
- Infuse the calculated volume of 3% Saline over 24 hours
- = (Desire Na^{++} - Serum Na^{++}) x TBW
- **TBW= Total body water** [TBW=0.6 x Body weight (male) TBW= 0.5x Body weight in kg (Female)]
- Desire Na^{++} 120 or 122 (mostly we take 120 mEq)

Q:- e.g. 50 year old male Patient, 60kg, with serum Na^{++} 112 mEq/L. Calculate deficit to be corrected in 24 hours

Ans:- Desired Na^+ level after 24 hours = 120 mEq/L, Current Na^+ level = 110 mEq/L SO

Na^{++} deficit to be corrected in 24 hour = (120-112) x (0.6×60) = 288 mEq

1000 ml 3% saline = 513 mEq/L Na^{++} SO 100ml 3% Saline = 51.3 mEq Na^{++}

1000ml 0.9% Saline (NS) Contain 154mEq/L Na^{++}

513mEq Na^{++} = 1L (1000ml)

288mEq Na^{++} =?

288/513 = 0.561L Now covert to ml = 0.561 X 1000 = 561ml so its mean 561ml contain 288mEq Na^{++} will correct deficit of 8mEq of Na^{++}

Corrected Na^{++} for this is Patient is 561ml to give in 24 hours

Give 50% in first 6 hours rest in 18 hours or give 561/24 = 23ml/hour (23ml/hour or IV @8drops/minute

Don't correct more than 8mEq/L Na^{++} in 24 hours

Another example for Na^{++} correction:

Q:- e.g. 50 year old male Patient, 70kg, with serum Na^+ 110 mEq/l. Calculate deficit to be corrected in 24 hours

Ans:- Desired Na^+ level after 24 hours = 122 mEq/l, Current Na^+ level = 110 mEq/l

Na^+ deficit to be corrected in 24 hour = (122-110) x (0.6×70) = 12 x 42 =504 mEq/l it's mean this need 50 mEq Na^{++} in 24 hour, as we know IL 3% NS give 513 mEq/l Na^+ & this patient 504 mEq/l so will give 980ml in 24 hour or 40.8ml/hour OR

→ 1000 ml 3% saline = 513 mEq/L Na^+ 100ml 3% Saline (one bottle) = 51.3 mEq Na^+

→ 504/51.3=9.8 bottle of 100ml 30%. Saline in 24 hours

→ per hour infusion = 980ml/24 hour = 40.8ml/hour or simply inf NS 3% IV @ 14 drops/minute

Note:

- If Na^+ < 122mEq/l stop infusion for that 24 hour (if not symptomatic)
- Restart infusion next day with new target Na^{++} level
- Stable Serum Na^{++} level over 24-48 hours or > 130mmol/l (or >130 mEq/l) for Safe discharge

Osmotic demyelination syndrome (ODS): Correct Na^{++} level slowly otherwise patient may develop ODS (dysarthria, Dysphagia, Flaccid quadriplegia, pseudo bulbar palsy)

Demyelination without inflammation in base of the Pons, with sparing of axons & nerve cells.

Urine Na^+ Concentration It is used to discriminate b/w extra renal and renal losses of Na^{++}

A) >20 mEq/L-SIADH, Salt wasting nephropathy, diuretics, hypoaldosteronism

B) <20 mEq/L- Extra renal Na^+ loss Diarrhea, Vomiting

Urine osmolality

- < 100 mOsm / Kg - Primary polydipsia with normal water excretion
- > 100 m0sm / Kg - Hyponatremia with impaired water excretion (SAIDH)

HYPERNATERMIA

Definition: Hypernatremia it define as a sodium concentration greater than 145mEq/L

Chief Complaint

- Lethargy, irritability, weakness, Dizziness
- Feature of underlying cause
- with severe hypernatremia (Na^{++} > 160mEq/L)

Hyperthermia, Delirium, seizures, coma

Past Hx; DM, CKD, AGE(acute gastroenteritis)

O/E: Vitals: (Pulse, BP, Spo2%, Temp)

- Orthostatic hypotension & Oliguria in dehydrated patient

Investigation:

1) **Serum Electrolyte** (Na^{++} > 145mEq/L)
2) **RBS:** (to rule out HHS and diabetes)
3) **Serum creatinine:** (to rule out renal failure)
4) **Plasma osmolarity**
5) **Serum potassium:** (Hypokalemia occur in diarrhea and vomiting)
6) Measure urine output (Diabetes insipidus, any other water loss like diuretics)
7) **Urine sodium:** the urine Na^{++} should be <25 mEq/L when water loss is the primary problems (diarrhea or vomiting), however, values >25 mEq/L don't exclude hypovolemia the urine Na^{++} typically above 100 mEq/L following in ingestion of salt or infusion of hypertonic Na^{++} solution

Calculation of water deficit:

water deficit is the amount of water Calculated to restore Na^{++} concentration to normal (140 mEq/L)

Water deficit =current TBW x serum Na^{++} –140/ 140

e.g, 60kg patient and current Na^{++} 160 mmol/L

Volume to be replaced?

= 60 x 0.6 x 160-140/140 = 5L

Note:

mmol/L = mEq/L

Rx: **Date:** **Time:**

Diet: Adequate water intake in shock patient

Calculate water deficit

- Oral free water in stable patients
- **Inf. 5% D/W, inf. 0.45% saline** IV @ 15 drops/min [50-70 ml/hour]

Hypernatremia with ECF Volume overload

(↑total body Na^{++} content)

- **Inf. 5% D/w IV @15 drops/min**
- **Inj. Furosemide (Lasix)** 40-60 mg IV

Hypernatremia with Euvolemic

- **Inf. 5% D/W OR inf. 0.45% saline** IV @15drops/min

Hypernatremia with hypovolemia

(diabetes with HHS coma)

- **Inf. 0.45% NS** IV @ 15 drops / min **OR**
- **Inf. 0.9 NS + inf. 5% D/W** IV

Rx of underlying cause

Raised ICP "hypernatremia as a treatment"

- Hypertonic saline, given in concentration ranging from 3% TO 23.4% can creates an osmotic force to draw H2O from interstitial space of brain parenchyma into intravascular compartment , ↓ICV and ICP
- Continuous 3% Nacl infusion 10-50 ml/hour titer every 2 hours per sliding scale to achieve target (serum Na^{++} <160mEq/L)

TBW= Total body water

TBW=0.6 x Body weight in kg (male)

TBW= 0.5x Body weight in kg (Female)

Reduction of Na^{++} level by IL 5% D/W

= measure Na^{++} / TBW + 1

e.g if 60kg patient with current Na^{++} 160mmol/L

So 1L 5% D/W will decrease Na^{++} level by

= 160 / (60x0.6) + 1 = 4.32 mmol

CAUSES: Mainly occur in patient who don't experience or respond to thirst due to impaired mental status (e.g elderly & critically ill) and in infants who can experience thirst but require others to provide fluid intake and for causes just remember **Remember 3D:** Severe **D**ehydration , **D**iabetes insipidus, **D**iuresis (osmotic) e.g HHS, excessive IV saline

Osmolality:

- Plasma osmolality > 295 mOsmol/kg (which represents a serum Na^{++} > 145 mEq/L)
- Urine osmolality: The normal value on a regular diet is 600 to 900 mOsmol / day
  - If both hypothalamic and renal function are normal, the urine osmolality in the presence of hypernatremia should be above 600 mOsmol/kg.
  - If the urine osmolality is intermediate (300 to 600 mOsmol/kg, the hypernatremia may be due to an osmotic diuresis or to DI (diabetes insipidus)
- If the urine osmolality is less than plasma osmolality (<300 mOsmol/kg) then patient has either central or nephrogenic DI. So should be subjected to water deprivation test.

SIADH (Syndrome of inappropriate anti-diuretic hormone)

Definition: Condition in which body make so much ADH hormone and cause Hyponatremia. Anti-diuretic hormone (ADH) or arginine vasopressin (AVP) or Vasopressin produce by hypothalamus and secreted by posterior pituitary.

Causes of SIADH

- Tumor: small cell lung cancer, Pulmonary disorders: pneumonia, TB, postivie pressure ventilation, Renal failure
- CNS disorders: Stroke, trauma, infection, psychosis
- Drug: Anticonvulsants (e.g carbamazepine) Antidepressants (e.g amitriptyline,, Fluoxetine) Hypoglycemic (chlorpropamide) opiate (morphine), psychotropic(haloperidol) cytotoxic (e.g cyclophosphamide, vincristine)
- Sustained pain, stress, nausea e.g post-operative state, acute porphyria and idiopathic

Diagnosis of SIADH:

- Patient are typically normovolemic (no edema)
- Low plasma Na^{++} concentration (<130 mmol/l)
- Low plasma osmolality (<270 mmol/kg)
- Inappropriately Concentrated urine (urine osmolality >100 mmol/kg)
- Urine Na^{++} concentration (> 40mEq/L)
- Normal K^{+} level, renal, adrenal, TSH and ABG (Acid base balance)
- Hypouricemia (urine acid < 4mg/dl): Due to uricosuric state induce by volume expansion
- Exclusion of other cause of Hyponatremia

Fluid status: SIADH will lead to water retention with Hyponatremia, but patient will have no edema. There is no impairment in volume regulatory hormones (aldosterone, ANP) so patient with SIADH are normovolemic

Calculation of excess Volume (to be removed)

Excess Body H_20 = TBW x [1- (Current Na^{+}/140)]

TBW = 0.6 x weight in kg (Male) = 0.5 x weight in kg (Female)

- **Diet:** high protein diet, or oral urea (30-60 g), oral salt in stable patients and treat like hyponatremia
- **Water restriction:** (500 to 1000 ml/day); fluid restriction is the main stay of treatment

Rx: **Date:** **Time:**

- **Inj. Furosemide (Lasix)** 40-60mg with Inf 3% saline IV or with oral salt (don't use normal saline)

Vasopressin receptor antagonist (vaptan, aquaretics) produce a selective water diuresis (aquaresis)without affecting Na^{++} & K^{+} excretion

Conivaptan (inhibit V1a, V2 receptor)

Dose: **Loading dose:** 20mg iv over 30 minutes followed by **Continuous infusion**; 20mg/day over 24hours for 2 to maximum 4 days.

dose may be ↑ to 40 mg/day continuous

- infusion as needed to raise serum sodium
- Monitor volume status & serum Na^{++}

Discontinue if hypovolemia, hypotension or undesirably rapid rate of rise of serum Na^{++}

Tolvaptan:

Oral; Initial 15mg OD (30-60mg OD daily)

Titrate; at 24 hours interval to desired serum sodium concentration.

Avoid fluid restriction during first 24 hours of therapy. Don't use for more than 30days

Avoid in patient with liver diseases, and not recommended if Cl cr < 10mL/min

HYPOMAGNESEMIA

Definition: when magnesium level is <1.8 mg/dL. The normal serum level is 1.8 to 3 mg/dL. Which indicates extracellular levels only. All clinical features determined by cellular magnesium levels

Chief Complaint:

Common symptoms are similar as hypokalemia, & hypocalcemia (most of the patient can have associated hypokalemia & hypocalcemia)

- Weakness and muscle cramps
- Tremors, athetoid movements, jerking, Nystagmus, & + Babinski response.
- Confusion, disorientation
- Arrhythmias, diarrhea & vomiting

Magnesium deficiency is also associated with

- Insulin resistance, metabolic syndrome, Hypertension
- Mg deficiency has been implicated in both migraine headaches and asthma

O/E: Vitals: (Pulse, BP, Spo2%, Temp)

- Hypertension, tachycardia
- As it cause decrease of PTH secretion so decrease Calcium (hypocalcemia): Carpopedal spasm, Trousseau & Chvostek signs : +

Investigation:

1) **Serum Magnesium level:** low
2) **Urinary magnesium:** urinary excretion of Mg^{2+} exceeding 10-30 mg in a 24 hour urine specimen indicates renal Mg wasting [24 hour urinary Mg excretion <10mg usually indicated an extrarenal source of Mg2+ losses (typically GIT)]
3) **Serum calcium** (Hypocalcemia)
4) **Serum electrolyte** (hypokalemia in 40-60% cases) & serum albumin, serum creatinine
5) **Serum PTH:** often suppressed
6) **ECG:** Features of hypokalemia

- Widening of QRS & peaked T wave with modest Mg2+ loss
- Prolong PR interval, progressive widening of the QRS & diminution of T wave with more severe Mg2+ loss

Rx: **Date:** **Time:**

- Maintain Airway, breathing, circulation

Asymptomatic with modest hypomagnesaemia (0.96mg/dl) and no vomiting

- Tab Magnesium oxide
  1+1+1 (250-500mg orally OD or BD)

Symptomatic or with low K^+/Ca^+:

If arrhythmia tetany or convulsion present

- Inf. Mgso4 50% 2 to 4 ml (1-2 gm) IV over 2-15 minutes followed by Inj Mgso4 12ml (6gm) in 1L NS IV @ 20 drops/min(or over 12 hours)

Mild symptoms or resolving of arrhythmia, or no arrhythmias (non emergent condition)

- Inf. Mgso4 50% 8-16 ml (4-8gm) IN 1L NS IV over 12-24 hours. till Mg^{++} > 1.2mg/dl

After Mg^{++} become > 1.2mg/dl Start oral therapy

- Tab magnesium oxide 250mg 1+1+1

Keep magnesium level > 2.5meq/L

Correct other electrolyte imbalance:

- Potassium and Calcium replacement

Note: Mgso4) available in inj form as 50%

1 ampule 10ml/5gm (1ml= 0.5gm)

Mgso4 can also be given intramuscularly (IM) in dose of 200-800mg/day

MONITOR: Tendon reflexes should be checked every 15 minutes (check knee jerk), hypomagnesaemia causes Hyporeflexia.

- Check Mg^{++} level every 1-2hour (especially in renal failure, as patient may go to hypermagnesemia)

Toxicity of mgso4 if occur can be managed with inj. Calcium gluconate 10% 10 ml IV over 10 minutes

Summary of treatment;

Mild case; inj mgso4 1gm IM every 6hr for 4 doses

Severe Asymphtomatic; inj mgso4 4-8g IM (≤ 1g/hour)

Severe symphtomatic; inj mgso4 4-8g IM (≤ 4g/hour)

Periodic Paralysis (PP)

Definition: The heterogeneous group of muscle diseases which is characterized by episodes of flaccid muscle weakness occurring at irregular intervals

- Most are hereditary, more episodic than periodic and divided into primary & 2ndry disorders...
- Primary PP includes 1) Hereditary 2) Alteration in serum K^+ level 3) myotonia 4) defective ion channels

Potassium related PP: The physiological basis of flaccid weakness is in excitability of muscle membrane (i.e. sarcolemma). Alteration of K^+ metabolism is the principal defect in primary PP.

Hyperkalemia periodic paralyses

- Flaccidity in the muscles. Muscles pain
- Weakness starts in the thighs & calves, then spread to arms, neck. Proximal weakness predominates; distal muscles may involve after vigorous exercise.
- Complete paralysis and respiratory involvement is rare
- Attack last for < 4hours
- Bowel and bladder dysfunction may occur.

Stressors: Weakness occurs after a period of strenuous exercise or during fasting and provoked by Potassium, cold, ethanol or stress.

If Mild

- Aborted at onset of light exercise.
- 2g/kg oral carbohydrate load.

1. Established Episode:

- Thiazide or inhaled beta agonist

2. Severe episode:

- Calcium gluconate, Insulin & dextrose IV (see management of hyperkalemia)
- Avoid stressors

Hypokalemic periodic paralyses

- Slight transient weakness of an isolated muscle group to severe generalized weakness.
- Attack start in the morning, often with Strenuous exercise or right carbohydrate meal or by stress, infection, menstruation, lack of sleep, medication like beta agonist, insulin, corticosteroids
- Mild attack are frequent and only involve particular group of muscles and may be unilateral partial (may effect predominately legs)
- The frequent start diminishing by age 30 and rarely occur after age 50years.
- Urinary out-put decrease during attack
- Permanent muscle weakness may be seen later in the course of disease

Management:

KCL 20ml oral solution TDS
KCL IV 40mEq (see management of hypokalemia)
Diet: low carbohydrate and low calcium
Tab Acetazolamide (AZM) 250 mg 1+1

Other type of PP are Paramyotonia congenita (SCANGA mutation, Andersen – tawil syndrome a

Thyrotoxic pen periodic paralysis:

Abrupt onset of hypokalemia and paralysis secondary to thyrotoxicosis (seen in Asian male)

Treatment :

- Acute episodes with KCL.
- Episodes are prevented by maintain euthyroid state and giving beta blocker (propranolol)

Dermatology

SCABIES

Definition: Scabies is caused by Sarcoptic scabies & is spread by direct skin contact the Scabies mite burrows into the skin, laying its eggs in the stratum corneum, commonly interdigital area, fingers, and ulnar edge of hand, wrist typically affects children & Young adults

Chief Complaint:

- Intense itching mostly at night
- In infants the face & scalp may also be affected

Past Hx: Contact Hx of similar complaints invariably present and Presence of Same Symptoms among family members

O/E:

- Linear burrows on the side of fingers, interdigital web & ulnar edge of hand, wrist.
- Popular lesions, excoriation at the site of predilection

Investigation: No need

Burrows & mite can be seen in hand by lens

Advice:

- Avoid Close physical contact with others until treatment is Completed
- Take daily bath with soap and water
- All family members & close contacts Should be treated at the same time, even if asymptomatic

Disinfection of bedding and clothing by laundering & sun exposure is required

Rx: **Date:** **Time:**

- **Permethrin 5%. lotion (Scabfree,Lotrix)**

Take both at bedtime then apply lotion on entire Surface of the body below neck (except face). then take a bath at morning & change clothes

May be repeatd after 7 days

- **Syp/Tab Cetirizine 10 mg(Rigix, Zyrtec)**

0+0+1 - 10 days

If Secondary injection suspected: Add

Tab Azithromycin 500mg(Azitma, Zygrel)

1+0+0 for 6 days

If Poor compliance or immunosuppression or heavy infection: Add

Tab Ivermectin 3 or 6mg (Ivermite) (0.2mg/kg) 2 stat or 200mcg/kg once , repeat after 7 to 14 days

Note:

- Permethrin 5% safe in pregnancy & lactation
- Benzyl benzoate is safe in children <2 years of age, but duration of treatment should be limited to 12 hours.
- Ivermectin is contraindicated in children <15kg

Permethrin tretament: All skin including scalp (except face) leave for 8-12 hour, & retreat in 7 days.

PARONYCHIA

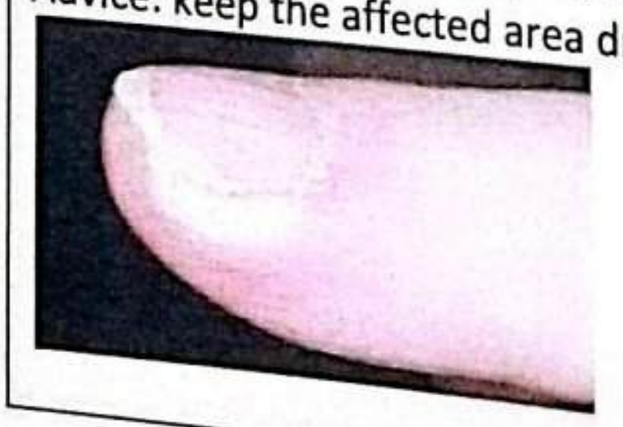
Chief Complaint:

Redness, Swelling & pain in paronychial area

Refection & cuticles towards the proximal nail bed

O/E: Tenderness in paronychial area

Advice: keep the affected area dry & clean.



Rx: **Date:** **Time:**

- **Cap Fluconazole 150mg (Fungone)**

Once weakly for 4-6 week

- **Tab Co-amoxiclave 625mg (Augmentin)**

1+1+1 - 7 days

- **Tab Tramadol+ paracetamol (Tonoflex-P)**

1+1+1 (For pain)

- **Cap Omeprazole 40mg (Zolbi)**

1+0+0 - before meat - 14 days

TINEA CAPITIS (Scalp ring worm)

Chief Complaint:

- A cause of scaring alopecia
- Patches of partial alopecia often oval or circular

O/E:

- Hair follicle discharging pus, thick crusting and matting adjacent hair
- May also be pustules at the active edge

Investigation: Not Perform Usually but can Scalp Scraping for microscopy & culture.

Rx: **Date:** **Time:**

- **Ketoconazole lotion (Conaz, ketowin)**
  Apply on scalp leave for 5 minute then wash Twice daily (for 2 weeks or longer if needed
- **Provat-S lotion + Dermosporin lotion**
  Mix and apply on scalp every -1 month
- **Tab Terbinafine 250mg (Lamisil, Terbisil)**
  1+0+0 for 8 to 12 weeks
  Contra in : pregnancy, breast feeding so use topical antifungal
- **For itching:**
  Syp/Tab Cetirizine 10 mg(Rigix, Zyrtec)
  0+0+1 - 10 days

TENIA CORPORIS

Chief Complaint:

- Ring Shaped lesion on body (single or multiple)

O/E:

Well defined annular, erythematous lesion with pustules & papules

Investigation: Not usually Performed but Skin scraping for microscopy & Culture

Advice: Avoid soap or detergent and To prevent recurrences: use foot powder and keep feet dry.

Rx: **Date:** **Time:**

- **Terbinafine cream (Cutis, Lamasil)**
  Apply twice daily continue for 14 days after clearing the lesion **or**
  Cream Miconazole 2% / Clotrimazole 10mg Can also be used
- **Tab Terbinafine 250mg (Cutis, Lamisil)**
  1+0+0 – 1 month **or**
  Cap Itraconazole (Icon)100mg
  2 cap OD for one week
- **Tab Fexofenadine 120mg(Fexet)** OD 2 Weeks

Tenia Corporis

Tinea Pedis

TENIA PEDIS / TENIA MANNUM (Athlete's foot)

Chief Complaint:

Common in adolescence
Catchy, pealing skin b/w toes

O/E:

Peeling fissuring & maceration in for clefts
Hyperkeratotic plaques

Investigation: Usually not performed
Skin Scraping for microscopy & culture

Rx: **Date:** **Time:**

- **Clotrimazole topical solution 1% (Dermosporin)**
  1 drop 3 time a day for 14 days **OR**
- **Clotrimazole + Hydrocortisone (Clozox H)** Apply twice daily for 14 days

Advice.

- Keep feet dry (web spaces) wear sandals
- Improve Personal hygiene
- Use Personal towel & foot wear

TENEA CRURIS (Jock itch)

Common in adult, more in male, caused by T. rubrum, T. mentagrophytes and are conformed to the groin & gluteal cleft usually sparing the scrotum
Peripherally spreading, sharply demarcated, centrally Clearing erythematous lesions

Chief Complaint:

- Itching in groin region (Intertriginous)
- Itching may be severe, or the rash may be asymptomatic

O/E:

The lesion have sharp margins, cleared center (erythematous plaques) in groins extend into thighs, with a raised active edge

Investigation: Not usually performed
Skin scraping for microscopy & Culture

Rx: **Date:** **Time:**

- **Clotrimazole cream (Clozox)**
  Apply once daily for 14 days

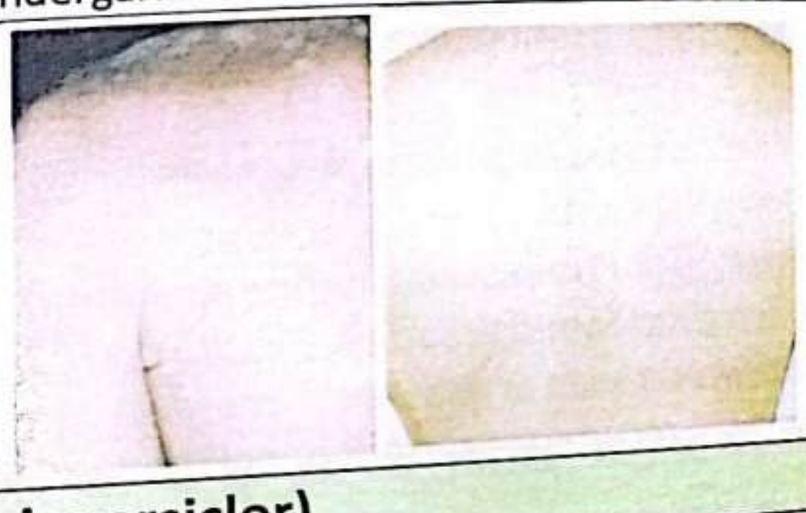
If no response then:

- **Terbinafine cream (Lamisil)**
  Apply Once daily for 1 week
- **Cap Itraconazole (Rolac)100mg**
  2 cap OD for 2 week **OR in refractory case**
  Tab Terbinafine 250mg (Cutis, Lamisil)
  1+0+0 for 2-4 weeks

Advice: Avoid soap or detergent
wear loose undergarment & clean regularly

Tinea Cruris:

Tinea Versiclor:



TINEA VERSICOLOR (Pityriasis versiclor)

It is a mild, superficial Malassezia infection of the skin common in warm months & also in immunocompromised upper trunk is mostly involved.

Chief Complaint:

Lesion are Asymptomatic
No itching, but in a few patients note itching.

O/E:

- Lesion are velvety, tan, pink or white macules or thin papule which is oval & non-itchy
- Hypopigmented (in black people)
- Hyperpigmented (in white people)
- Lesion may appear on the trunk, upper arms, neck & groin

Investigation:

Skin scraping for microscopy
(Large, blunt hyphae & thick-walled budding Spores "Spaghetti & meat back" or bananas & grapes like hyphae.

Rx: **Date:** **Time:**

- **Cap Itraconazole 100 mg (ICON)**
  1+0+1 for 5 days
- **Ketoconazole shampoo 2% (Conaz)**
  Apply on affected & rub, leave sharp. For 5 minutes then wash with water.
  Twice weekly for 2 months.
- **Selenium sulfide (Selson blue lotion)**
  Apply of affected area leave it for 5-15 minutes for 7 days
  or VerciCare soap

PSORIASIS

It is a common & Chronic skin disorder commonly occurs in extensor surface of knee, elbow, wrist, extensor surface of limbs. **Chronic plaque psoriasis** is the commonest. **Flexural psoriasis:** Psoriasis skin is smooth **Guttate psoriasis:** Common in children & young adult. **Pustular psoriasis:** Commonly occurs on palms & soles

Chief Complaint:

- Silvery scales or bright red, dry, well demarcated Plaques in extensor Surface of knee, elbow, wrist, extensor surface of limbs
- Mild itching is common
- Pruritic
- Comments affecting scalp, elbow and knee
- Other features
  Nail sign: pitting onycholysis
  Psoriatic arthritis

O/E: Vitals

- **Grattage (scratch) test:** scale can be removed in layers (similar to one Scratching a wax candle)
- **Au Spitz Sign:** when the scales are completely Scraped off, multiple bleeding points are seen
- **Koebner phenomenon**-Lesion produced at trauma sites

Factors That worsen psoriasis (triggers)
Trauma, stress (emotion & anxiety)
infection (Streptococcal infection)
Drugs: Beta blocker, anti-malarial, NSAID, ACEI

Referral(To dermatologist if)

- ✓ Generalized pustular or erythrodermic psoriasis
- ✓ Failure to respond to primary care management
- ✓ Patient's psoriasis is acutely unstable
- ✓ So extensive that self-management is impractical or in a sensitive area (face, hand, feet, genitalia)

Rx: **Date:** **Time:**

Mild plaque Psoriasis (<10% Body surface area involve):
Potent topical corticosteroid

- Coal tar+ Hydrocortisone + salicylic acid **(Cosacort) mix with Provate-S in Vaseline**
  Apply on affected area twice daily 2-3 week
- Calcipatriol + betamethasone ointment **(Calcibet ointment) at night daily** 2-3weeks
- **Coal tar (Megatar shampoo)** for twice weekly—continue
- **Tab Loratadine 10mg (Lorin-NSA) 10mg**
  0+0+1 at night [for itching]

Moderate to severe plaque psoriasis without psoriatic arthritis; PUVA (UV Phototherapy)
Moderate to Severe plaque psoriasis with psoriatic arthritis OR generalized pustular psoriasis ;

- **UVB (NB-UVB)** 3 Times weekly if no response then
- **Psoralen + UVA(PUVA)**
  (Skin examination every 3-6 months)
- **Tab methotrexate 2.5 mg (Cytothrexate)**
  3 tab once weekly(on Friday)
- Tab folic acid 5 mg daily (except on Friday)

Avoid triggers and keep the involve area moist
For better management refer to dermatologist

ANDROGENIC ALOPECIA

Chief Complaint:
Most common form of alopecia (genetic predominant)
Bitemporal remission initially and subsequent involvement of the crown "male pattern"
Extent of hair loss is variable & unpredictable
Often diffuse in women (There is retention of the ant hairline while there is diffuse thinning of the vertex scalp hair)

Rx: **Date:** **Time:**

- **Tab Finasteroid 1gm (Hairfin)**
  0+0+1 - 2 month
- **Minoxidil topical Solution 5% hair spray (Minoxin plus)** 6 puff + 6 puff - 1 year
- **Tab Biotin** 1 tab daily - 4 month
- **Biomax hair Shampoo**

Other option: scalp surgery Autologous hair transplant

ALOPECIA AREATA

Chief Complaint: Autoimmune condition

- Localized, well demarcated non-inflammatory. Non-scaring patches of hair loss usually involve but can spread to eyebrows, eyelashes, beard & body, beard.

Exclamation hairs" (tiny hairs 2-3 mm in length) can be seen

Alopecia total is: All Scalp involve

Alopecia universalis: All Scalp & body hair involves

Investigation; CBC, RBS, TSH, RFTs, LFTs

Rx: **Date:** **Time:**

- **Tab Refollium** 1+0+0 for 2 months
- **Ticovate lotion** Apply on affected area at night 1 month
- **Minoxidil topical Solution 5% hair spray (Minoxin plus)** 6 puff + 6 puff – 3months
- **Inj Triamcinolone 40mg (KENACORT-A)** Intralesional one injection per month till response is achieved
- **Tab Prednisolone 5mg (Deltacortil)**
  4+0+4 for 1week then
  3+0+3 for 1week then
  2+0+2 for 1week then
  2+0+1 for 1week then
  1+1 for 1week then 1+0+0 for 1 week
- **Cap Esomeprazole (Ezomol) 20mg** BD till taking steroids
- **Tab methotrexate 2.5mg (Cytothrexate)**
  3 tab once weekly (on Friday)
- **Tab folic acid 5mg** every day except on Friday

BOILS (FURUNCULOSIS)

Chief Complaint:

- A hard, tender, red nodule surrounding a hair follicle becomes larger & fluctuant after several days
- Fever, malaise: ±
- Later: discharge pus & central core before healing: may leave a scar.

Past Hx: DM, IMMUNOSUPPRESSIVE drugs

Rx: **Time:**

- **Tab Co-Amoxiclave (Augmentin) 625mg**
  1+1+1 - 5 days
- **Cap Omeprazole 40mg(Teph-insta)**
  1+0+0 - 14 days
- **Tab naproxen (Neoprox, Synflex)**
  1+1+1 (if pain present)

Boils:

Carbuncle:

CARBUNCLES

Def: A Carbuncle consist of several boils (furuncles) developing in adjoining Hair follicle and cool icing to form a conglomerate, deeply situated mass with multiple drainage points

Chief Complaint:

- Pain and tenderness, fever, malaise
- The abscess is either rounded or conical
- Swollen, pain area discharging Pus from several points

Past Hx: DM, Malnutrition, prolong Steroid use drug

Investigation:

1) **CBC** (slight leukocytosis may be seen), **RBS**

Rx: **Date:** **Time:**

- **Tab Co-amoxiclave (Augmentin) 625mg**
  1+1+1 - 7 days
- **Cap Omeprazole 40mg (Zolbi, Risek)** 1+0+0 - 14 days
- **Tab Clindamycin 300mg** () 1+1+1 - 10 days

At a time of drainage have higher cure rate

- **Tab Naproxen 500mg (Neoprox, Synflex)** BD (for pain)

URTICARIA

Definition: Urticaria is a Vascular reaction of skin characterized by formation of wheals, surrounded by red halo or flare associated with severe itching, stinging or pricking sensation.

Classification:

Acute (1-2 week) - Self-limited complete resolution occur within 6 weeks

Chronic (>6 week) - Daily episodes of urticaria & or angioedema more common in women

Chronic inducible urticaria: Is reproducibly triggered by specific exposure (Cholinergic, Solar, cold urticaria, dermographism, & delayed pressure urticaria)

Chronic Spontaneous urticaria: Demonstrate auto antibodies directed against mast cell IgE receptor

Chief Complaint:

- Erythematous wheals, or hives with or without angioedema (angioedema of Lips, face, scrotum, larynx & trachea)
- Intense itching; very rarely, Pruritis may be absent
- Dermographism is induce by Scratching.

Investigation: Not usually done

1) **CBC:** Eosinophilia in parasitic infection or drug cause
2) **ESR:** Elevated in vasculitis
3) Serum Urea and electrolytes
4) **TSH and LFTs, iron studies:** may reveal an underlying systemic disorder
5) **Total IgE** & Specific IgE to possible allergens
6) **Autoantibodies;** particularly ANA: SLE and urticarial vasculitis.
7) **C3 and C4 levels:** if these are low due to complement consumption, C1 esterase inhibitor activity should be measured.
8) **Infection screen:** hepatitis screen, HIV
9) **Skin biopsy:** if urticarial vasculitis is suspected
10) **Challenge tests:** to confirm physical urticaria, such as dermographism, pressure, heat, cold

Rx: **Date:** **Time:**

1) **Anti-Allergic:** (one or in combination)
- **Tab Fexofenadine 120mg (Fexet-D,Telfast)** 0+0+1= 1 to 2 weeks **OR**
- **Tab cetirizine 10mg(Rigix, Zyrtec)** 0+0+1 =1-2 weeks **OR**
- **Tab Loratidine 10mg (Lorin-NSA, Softin)** 0+0+1

If with any above drug no response seen after 2 weeks; Alternate non-sedating antihistamine or another anti-allergic from above

2) **Tab famotidine 40 mg (Famoit)** 1+0+0 =1-2 weeks
3) **Tab Montelukast 10mg (Montika)** 0+0+1
4) **Tab Mebendazole (Vermox) 100mg** 1+0+1 3 days [to deworm the patient]
5) **For Recalcitrant or chronic Urticaria:**

- **Doxepin 10-75mg** 0+0+1 at bed time
- **UBV therapy;** helpful in some cases
- **If skin biopsy of lesion identify neutrophil Then Add;** Dapsone or colchicine
- **For refractory chronic urticaria or no response to high dose anti-histamine;** Omalizumab

ECZEMA AND DERMATITIS

Definition: Defined as pruritic inflammatory disease of skin caused by various external & internal factor also called Atopic dermatitis, onset in childhood most common, onset after age 30 is uncommon

Diagnostic Criteria

Any itchy skin condition in the last 12 months plus 3 or more of

1) Onset below age 2 years (not use in children under 4 years)
2) Hx of flexural involvement or dermatitis on the cheeks &/or extensor areas in children aged 18 months or under.
3) Visible flexural dermatitis (flexural lich entifications)
4) Hx of generally dry skin
5) Personal Hx of ethier atopic disease in children aged under 4years, Hx of atopic disease in a first degree relative may be included

Chief Complaint:

- Itching which may be severe & prolong
- Eruptions on erythematous skin with erosion & exudation in acute cases or thickening
- Well defined scaly, red plaques affect the face, neck and upper trunk, flexural surfaces of elbow and knees are often involved.
- In chronic cases; Skin is dry & lichenified (fissuring with pigmentation)

Rx: **Date:** **Time:**

- **Inj. Methylprednisolone 80mg** (Depo-Medrol) IM stat
- **Tab Cetirizine 10mg (Rigix)**
  0+0+1 at night 10 days
- **Zerrox ointment** apply on affected area for one month

For better management: refer to dermatologist

Advice to patient:

- Loose Cotton Clothing: Avoid wool (exacerbate eczema)
- Avoid excessive heat: keep nail short gloves in bed
- If a specific irritant is identified (e.g., house dust mite, Pets) then avoid.

COLD SORE

Chief Complaint:

- Recurrent eruptions can occur, precipitated by overexposure to sunlight, febrile illnesses, physical or emotional stress, or immunosuppression.

Rx: **Date:** **Time:**

Self-limiting but we can prescribe;

- **Acyclovir Cream 5%. (Acylex)**
  5 times per day for 5 days. If no response can switch to oral Acyclovir
- **Tab Fexofenadine 120mg (Fexet)**
  0+0+1 - 14 days.
- **Tab Paracetamol 500mg (Panadol)**
  1+1+1 (if fever, pain present)

IMPETIGO

Definition: It is a contagious superficial bacterial infection usually caused by either stap aures or strep pyogenes. Very common in childhood

Chief Complaint:

- Golden Crusted skin lesions typically around mouth
- Lesion spread rapidly & consist of macules, vesicles, bullae, pustules & honey or golden crusted.
- The face or other exposed part are commonly involved

Advice:

No sharing of towels, face flannels e.t.c

Reassure that non-scarring

Rx: **Date:** **Time:**

Mild or localized cases; (less than 5 lesion in a single skin area)
Thoroughly clean the affected area with soap & water and dry it then

Mupirocin 2% ointment (Mupir, Bactoderm)
Apply 3 time daily to tiny areas of impetigo for 7-10 days

Follow up within 3 days. If no improvement OR In Wide spread cases or immune compromised individual: Antibiotic

1) **Cap Amoxicillin+ floxacillin (Biflocin)** 500mg 1+1+1
   Syp Amoxicillin+ floxacillin (Biflocin) (Syp 1 TSF TDS) 7 days
   [Children: 50-100mg/kg] **OR**
   Tab/syp Co-Amoxiclave (Augmentin) 625mg
   1+1+1 (syp 1 tsf BD) 7 days **OR**
   Cap cephalexin 250mg (Ceporex)
   1+1+1+1 for 7 days

Alternative:

- **Cap Doxycycline 100mg (Vibramycin)** BD 14 days

In penicillin allergic:

- **Tab Erythromycin (Erythrocin)** 500mg BD or
- **Cap Clindamycin (Dalacin)** 300mg QID

2) **Tab Metronidazole (Flagyl)** 400mg 1+1+1
3) **Tab/Syp Linezolid 600mg (Nezkil)** 1+0+1
   IN children Syp Linezolid 100mg/5ml (Ecasil) 1 tsf BD

Recurrent impetigo with Nasal carriage of Seizures:

1) **Tab Rifampin 300mg** ( )1+1 - 5 days
2) **Mupirocin 2% ointment (Mupir)**
   in the dose twice daily - 14 days

SEVRE CASES: (Antibiotic Protocoal as above)
Cap/Syp Amoxicillin+ floxacillin 500mg 1+1+1 (Syp 1 TSF TDS) 7 days [Children: 50-100mg/kg]
if Penicillin allergic then;
Tab Erythromycin (Erythrocin) 500mg 1+0+1

FOLLICULITIS

Definition: Have many causes frequently caused by staphylococcal infection more common in diabetic patient & in children. Gram negative folliculitis, pseudomonas folliculitis (Hot tub folliculitis & non-bacterial folliculitis caused by friction and oils

Chief Complaint:

- Range from Slight burning & tenderness to intense itching
- The Lession Consist of Pustules & Hair follicles.
- Present as pustular and erythema in Hair bearing areas (e.g., scalp. Leg, beard area)
- Abscess formation is major complication of bacterial folliculitis

Rx: **Date:** **Time:**

- **Tab Co-Amoxiclave (Augmentin) 1gm** 1+0+1 6days
- **Cleanse the affected skin once daily with an antiseptic wash. Avoid heavy occlusive ointment**
- **Fusic acid (Fucidin or Fudic cream)**
  Apply on affected area twice daily
- **Inj. Ketorolac 30mg (Toradol) 1 amp im stat**

Pseudomonas folliculitis:

- Clear spontaneously
- **Tab Ciprofloxacin 500mg (Cipval, Novidat)**
  1+0+1 - 5 days

Eosinophilic folliculitis:

Initially: Topical Steroid antihistamine

In more severe cases:

- Permethrin lotion 5% (Scabfree)Apply on Lesion leave for 12 hour then wash every other night for 6 weeks
- **Cap Itraconazole 100mg (Icon, Rolac)**
  1+0+1 for 5 days
- UVB or PUVA phototherapy

Malassezia (pityrosporum) folliculitis:

- Sulfacetamide lotion Apply twice daily

Demox folliculitis:

- **Permethrin lotion 5% (Scabfree)**
  Apply an affected area leave for 12 hours then wash
- **Tab Ivermectin (Ivermite)**once weekly [200mcg/kg]
- **Tab Metronidazole 400mg (Flagyl, Riam)**
  1+0+1 5days

WARTS

Chief Complaint:

- Verrucous papule anywhere on the Skin or mucous membrane, usually no > 1cm in diameter
- Initially smooth, skin-colored papules, which become hyper keratotic and warty
- Most common hand but can occur on the face, genitalia and limbs

Planter warts: Tender on pressure

Anogenital wart: itching

Rx: **Date:** **Time:**

- **Salicylic Acid cream (Movelat, Aknonil)**
  Apply at night & wash off in morning Regular paring

Refer to dermatologist for:

For plantar wart: Blunt dissection

For recurrent wart, periungual warts, planter warts and genital wart:

- CO_2 laser therapy.
- Inj. Bleomycin 1 unit/ml injected into common & plantar wart

Advice: Soaking warts in hot (42.2C) water for 10-30 mins daily for 6 weeks

VITILIGO

Definition: In vitiligo, pigment cell (melanocytes) are destroyed, present in approximately 1% of the population may be associated, autoimmune, thyroid disease, pernicious, diabetes mellitus and Addison disease (autoimmune disease)

Chief Complaint:

Present as smooth sharply defined white macules or patches which contain no melanocytes

Precipitated by injury or sunburn to Koebner's Phenomenon may be present (lesions appear at site of skin damage)

Distribution: often symmetrical

Sites: Hand, wrist, knees, neck, face, around eye, mouth & hair may also be affected

family Hx, any autoimmune diseases

O/E: Skin: Bright white under wood's Light

Note,

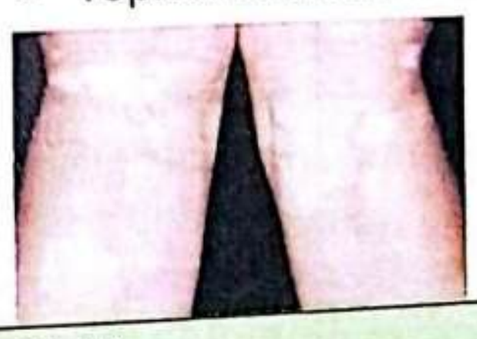
- years of treatment may be required so patient Should be strongly motivated
- There is no cure
- Use sunscreens for affected area

Rx: **Date:** **Time:**

1) **Tacrolimus 0.1 % (Eczemus 0.1 %) ointment**
   Apply at night on affected area for one month
2) **Methylprednisolone aceponate (Advantan) cream 0.1 %**
   Apply BD for 15days in amonth for 2 months
3) **Tab Ivermectin 6mg (Ivermite)**
   3 stat then 3 tab after 10 days
4) **Methoxsalen (Lukodermine ointment)**
   once weekly on affected area
5) **In Secondary Hypopigmentation;** depigmentation may occur spontaneously

If 20% to 25% involvement then

- Narrowband UVB or oral PUVA
- Topical calcineurin inhibitors (Tacrolimus, Pimecrolimus)



MELASMA

Definition: An acquired light on dark brown hyperpigmentation that occurs in the exposed areas, most often on checks. Associated with-pregnancy, OCP, sun exposure, diphenylhydantoin, & may be idiopathic

Chief Complaint:

Often appears during pregnancy in women living in dry sunny climates.

OR women taking OCPs

Asymptomatic

Rx: **Date:** **Time:**

1) **Clarimac plus cream** apply 2 time daily for 21 days
2) **Tab Redoxon** once daily for 2 months
3) **Hydroquinone 4%. Cream** Apply locally once daily
4) **Can also add any multivitmains (Vitrum, surbex-z)**

MILIARIA (Heat rash)

Definition: Also called "sweat rash" is a skin disease marked by burning itching, superficial aggregated small vesicles, popular of pastures on covered areas of skin, usually trunk due to Sweet trapped under the Skin by clogged sweat gland ducts, with ultimate rupture of sweat gland. A hot, humid environment is most frequent causes of Increased risk with; occlusive clothing, fever while bedridden and Medication (Clonidine, beta blockers, opioids)

Chief Complaint:

- Burning itching and secondary infection Can occur & lead to periporitis (multiple step abscesses)
- Echematization can occur

NOTE;

Avoid heat and wear loose clothes
Control local enviroments (remove excess bedding, fans, air conditioning)
Cool the skin (damp compression, cool shower)

Rx: **Date:** **Time:**

- **Dermsave lotion** apply tds for 10days **OR**
  Milirex lotion 40ml Apply 2 to 4 time daily
- **Tab Cetirizine 10mg (Rigix)**
  1+0+0 - 10 days

For Secondary infection: Add
Tab Azithromycin 500mg (Azitma)
1+0+0 - 6 days
In Severe cases
Tab Glycopyrrolate 1mg 1+0+1

GENERALIZED HYPERHIDROSTS

Chief Complaint:

- Excessive Sweating over whole body

Causes:

Physiological; After and during, exercise, hot humid condition emotional response (anxiety)
Infection: (bacterial or viral)
Non-infective: (Menopause, Thyrotoxic, Pheochromocytoma, Lymphoma, Leukemia

Investigation:

1) **CBC with MP**
2) **TSH**

Investigation according to suspected causes

Note: Advice to

- Avoid Clothing made Lycra, nylon & other man-made fibers and tight clothing were colors that don't show sweaty
- Use emollient washes/moisturizer rather than soap Identify & avoid trigger factors.

Rx: **Date:** **Time:**

First line medication:
Aluminum chloride hexahydrate and topical anticholinergic Glycopyrrolate
Find and treat the cause condition
If no cause found:

- Tab Propantheline Bromide
  15mg 1+0+1 - 2 weeks

For focal hyperhidrosis (mainly affect axillar, sole of feet's &/or face)

- **Aluminum chloride hexahydrate Solution 20%.(Driclor)**
  Apply to clean skin at night-wash off in morning and decreased frequency of application as symptoms subside
- Tab Propantheline Bromide 15mg. 1+0+1

If no response: Refer to dermatologist, or vascular surgeons.

ACNE

Definition: It is disease in which there is excessive sebum secretion associated with obstruction of pilosebaceous duct.
Face, nose, neck, back, shoulders commonly affected.
Causes: hyperandrogenism, PCOS, in patient who use systematic corticosteroids or topical fluorinated corticosteroids on face. Acne may exacerbated or caused by cosmetic cream or oil.

Chief Complaint:

- Lesion mainly occurs or on face, nose, upper chest back shoulder
- Pain or itching
- Spots on face, neck & back & chest

O/E: Mild tenderness, Black heads & whiteheads

- Comedones (tiny, flesh-colored, white or black non inflammatory
  Superficial papules) - Acne Verlgaris
  •Inflammatory papules, pustules, ectatic pores, acne cyst scarring from and lesion
- Burrowing (conglobate acne) are seen in Severe case
- Scars may become Keloid.
- Different presentation at age

Pre-teens: Comedones
Young teenagers: Inflammatory lesion
Third & 4th decades: Popular lesion on chin & jawline.

Advice: Proper use of medication

- ✓ washing / cleaning of face twice daily to keep skin non-sticky, dry & dirt free
- ✓ Shampoo use: to keep scalp non greasy.
- ✓ Avoid excessive Cosmetics

Rx: **Date:** **Time:**

Diet: low glycemic diet (reduction in Insulin resistance), healthy life style

COMEDONAL ACNE (open & Closed Comedones)

- **Isotretinoin 0.025%, Cream (Isotin, Isotrex)** wash face & wait for 20 min than apply Cream Apply twice weekly at night 4-6 weeks **OR**
  Benzoyl peroxide 2.5%.
  Apply to clean skin initially once daily on alternate days even twice a day or more 4-6 weeks

PAPULAR OR CYSTIC INFLAMATTORY ACNEP (moderate inflammatory acne: frequent papules & pustules with mild scarring).

1. **For Mild:** Topical Rx
   Benzoyl peroxide+ Clindamycin (Dupearl) gel 25g
   Apply twice daily for 4-8 weeks **OR**
   Benzoyl peroxide + erythromycin gel
   Apply twice daily for 4-8 weeks
2. **Moderate case:** First try topical as above if no response in 4-8 weeks "then add
   Cap Doxycycline 100 mg (Vibramycin)
   1+0+1. 3 months **OR**
   Tab Azithromycin 500mg (Azitma) OD 4 consecutive days in 1 month repeat the same for 3 months OR
   1+0+0 Consecutive day, (repeat every 3 days on same days in coming months) for 6 months

In Severe Case: Add

- Cap Isotretinoin 0.5-1mg/kg/ day 20 weeks
- Intralesional injection Dilute suspension of triamcinolone acetonide (2.5mg/ml, 0.05 mL/lesion

Scar Revision: Refer to Dermatologist.

Note:

- ❖ Benzoyl peroxide safe in pregnancy and Isotretinoin, doxycycline Contraindicated in pregnancy.
- ❖ If Patient requires long term Systemic therapy then dosing of Doxycycline 40-50mg orally daily.
  After taking doxycycline patient should be erect for Atleast 30 min & drink a lot of water
- ❖ women With tretament resistance acne: combination oral OCP or Spironolactone (50-200mg PO daily)

PEDICULOSIS (LICE INFESTATION)

Head lice (Pediculosis Capitus), Body lice (Pediculosis Corporis) , Public lice (Pediculosis Pubis)

Chief Complaint:

- Severe itching, frequently followed by secondary bacterial infection with regional lymphadenopathy and eczematization.
- Pruritus with excoriation
- Resulting in matting of hair
- Transmission occurs by head-to-head contact, sharing of combs and caps, infested clothing of bedding and poor personal hygiene
- Transmission of pubic lice is by sexual contact.
- Blue grey maculae (maculae cerulean) of altered blood may be seen at the site of louse bite/feed

Note:

- Wet-comb conditioned hair with a fine-tooth comb until all lice are removed and repeat at 3-4 day intervals for 2 weeks
- Infested clothing and bedding should be washed properly in hot water and dried in sunlight
- Clothes should be ironed from inside with special attention to seam line
- In pubic lice infestation, sex partner should be treated as well

Rx: **Date:** **Time:**

A) For head lice:

- **Permethrin 5% (Scabfree) lotion**

Apply on dry hair & leave it for 8-12 hours
Using twice 7 days apart

- Other effective topical lotion; Ivermectin 0.5%
- If eyelashes involved:
  Petrolatum apply twice daily for 8 days

Systemic treatment:

- **Tab Ivermectin (Ivermite)** 6mg 2 tab PO stat
- **If persistence itching:**
  Tab Cetirizine 10mg (Rigix) 0+0+1 - 10 days
- **If Secondary infection present:**
  Tab Azithromycin 500mg (Azitma) OD 6 days or
  Tab TMP-SMZ (septran-DS) 1+0+1 10 days

B) Body lice:

- **Permethrin powder (Mite-free) apply 30-60g**
  To inside of clothes and underclothes in contact with the skin (Inside of cloth + body skin) then rub in powder by hand leave it for 12-24 hour
  Can repeat after 10days if infection persist

C) Pubic lice:

- Shave hairs of pubic area
- Permethrin 1% lotion (Mite-free)
- Rinsen to pubic hairy area for 10 minutes
- If itching Tab Rigix 10mg OD at night
- If 2ndry infection present:
  Tab Azithromycin 500mg (Azitma) OD 6 days

CELLULITIS AND ERYSIPELAS

Cellulitis: acute infection of the dermis and subcutaneous tissue.
erysipelas: an infection of the upper layer of the skin (epidermis) result

Chief Complaint:

- Cellulitis commonly affects Legs
- Erysipelas affect face
- Blistering often occurs & may be painful
- poorly demarcated margins in cellulitis in Contrast to erysipelas which has sharply defined borders

O/E: Vitals, ACKLET, Redness, warmth, edema, tenderness, Fever (>38 c/100.4F), confusion

- Tachycardia, Tachypnea
- Hypo tensional, Regional lymphadenopathy

Investigation:

1) **CBC**: (leukocytosis) **RBS**
2) **Blood cultures /Obtain culture of purulent drainage, biopsies, or swab**
3) **Doppler Ultrasound**

NOTE:

- Blood cultures are positive in < 5% of cases & should not be routinely ordered, but can be considered if systemic illness is present.
- Cultures of aspirate or skin biopsy are generally reserved for atypical cases.

Necrotizing fasciitis: Rapidly progressive inflammatory infection of the fascia with 2ndry necrosis of SC tissue.

Rx: **Date:** **Time:**

In severe case:

- **Maintain Airway, breathing, Circulation**
- **Inj. Co-Amoxiclave (Augmentin)**
  1.5gm IV stat and TDS 5-7days
- **Inj. Omeprazole 40mg (Risek, Ruling)**
  1 vial IV Stat & BD
- **Inf. Metronidazole (Flagyl)** 100ml IV TDS
- **Inj. Clindamycin 150mg (Dalacin-C) IV**
- **Inf. NS 500ml IV TDS**

Regimen Active against MRSA

Clindamycin, TMP-SMX, Doxycycline

If purulent or abscess is present then linezolid

Tab Linezolid (Nezkil) 600mg 1+0+1 7 days

MRSA/Antipseudomonal

•For patients with MRSA risk factors or systemic inflammatory response syndrome, choose IV Vancomycin or an alternative agent with activity against both streptococci and MRSA.

1. Adjust antibiotic When Specific exposures are identified
-Ampicillin-Sulbactam: If human, dog or cat bite
-Quinolone: if fresh water laceration.
2. When possible, elevate the upper limb.
3. DVT Prophylaxis
4. Urgent Surgical Consultation if necrotizing fasciitis
5. Dressing: treated with Glycerin & magnesium sulphate dressing

Rx on discharge:

1. **Tab Co-Amoxiclave (Augmentin)** 625mg TDS
   If Penicillin allergic then
   Tab Erythromycin (Erythrocin) 500mg 1+0+1
2. **Tab Metronidazole (Flagyl)** 400mg 1+1+1
3. **Tab Linezolid 600mg (Nezkil)** 1+1

Duration of treatment: 5 to 7 days

ENT

TONSILLITIS/PHARYNGITIS

Chief Complaint:

- Sore throat, fever
- Dysphagia, Generalized body ache, malaise
- Hoarseness or less voice
- Feature of Group A β-hemolytic Streptococcal infection (GABHS): Fever over 38 °C
  Tender anterior lymphadenopathy & Lack of Cough
  Pharyngotonsillar exudate
- Odynophagia (in severe case)

O/E: Vitals (Pulse, BP, Spo2%, Temp) JACKLET

- Congestion of the tonsils and anterior Pillars/posterior pharyngeal wall
- Enlarge & tender jugulodigastric lymph node

Investigation (Not usually done)

1) CBC
2) Throat swab for C/S

Note: Young children have a lot of throat infections and most will grow out of the problem without the Need for Surgery

Indication of tonsillectomy:

- 4-6 or more attacks of documented tonsillitis per Year for 2 year or longer
- Airway obstruction very large tonsils causing Sleep apnea
- Chronic tonsillitis > 3 months. halitosis
- Peritonsillar abscess, 2 or more attacks or Single attack with recurrent acute tonsillitis
- Suspected malignancy of the tonsils (unilateral tonsillar enlargement)

Rx: **Date:** **Time:**

Diet: Avoid spicy & oily food, Drink more water

Antibiotic: (any one of the following)

- **Tab Co-amoxiclave 625mg (Augmentin)**
  1+1+1-7 days **OR**
  Cap Cephradrine 500mg (velocef, Lenwin)
  1+1+1 - 7 days **OR**
  Cap cefuroxime 500mg (Zinacef, Zecef)
  1+0+1 - 7 days **OR**
  Tab Azithromycin 500mg (Azitma)
  1+0+0 for 6 days (in resistance case)

Ant-allergic:

- **Tab Fexofenadine 120mg (Fexet, Foxet)**
  0+0+1 - 10 days.

Painkiller/Anti-pyretic:

- **Tab Flurbiprofen 100mg (Froben, Ansaid)**
  1+0+1 - 7 days
  Cap Esomeprazole 20mg (Nexum, Ezomol)
  1+0+1 - 14 days or till taking painkiller

Mouth wash:

- **Enziclor mouth wash:** Gurgle with 2-3 TSF in 1/2 glass of Luke warm water TDS - 7 days

If pregnancy then

- **Tab Azithromycin 500mg (Azitma, Zygrel)**
  1+0+0 - 6 days
- **Tab Paracetamol (Panadol) 500mg**
  1+1+1 (for fever and pain)
- **Tab Loratidine 10mg (Lorin-NSA, Softin)**
  0+0+1 at night for 10 days

HOARSENESS

Hoarseness is caused by an abnormal vibration of the vocal fads. Differentials are URTI. Laryngitis, trauma, carcinoma of larynx, carcinoma of lung, hypothyroidism, Acromegaly neurological problems (e.g., laryngeal never palsy, MND, Myasthenia gravis (MG) , Multiple sclerosis (MS), Muscular problems, functional

Chief Complaint:

- Hoarseness of voice
- Detail Hx need (Malaise, fever, pain on using voice, Hx is shouting, coughing, vomiting, stridor, dysphagia, Hx of smoking, Hx of loss weight
- Hoarseness >2 weeks should be evaluated by an otolaryngologist with laryngoscopy.

O/E: Vitals, Lymph node examination (cervical)

IX: CXR PA view , TSH, FT4, Laryngoscopy

Rx: **Date:** **Time:**

- **Advice:** Voice rest
- **Tab Co-amoxiclave 625mg (Augmentin)** 1+1+1 - 7 days **OR**
  Cap Amoxicillin 500mg (Amoxil, ospamox) 1+1+1 7 days
- **Cap Esomeprazole 20mg (Nexum, Ezomol)** 1+0+1 - 7 days
- **Tab Flurbiprofen 100mg (Froben, Ansaid)**
  1+0+1 - 7 days (if pain present)
- **Tab Fexofenadine 120mg (Fexo, Fexet)**
  0+0+1 (at night) 10 days
- **Tab Serrato peptidase 10mg (CONZYME)** 1+0+0 14 DAYS

APHTHOUS ULCER (canker sore, ulcerative Stomatitis)

Chief Complaint:

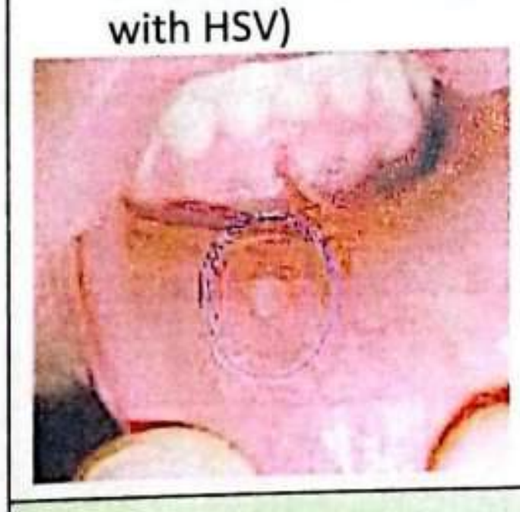
- Painful, small round, superficial ulcers in mouth
- Single or multiple usually recurrent
- Common in women prior to menstruation

O/E:

- Small, round ulcerations with yellow-gray fibrinoid centers surrounded by red halos
- Minor ulcer: <1 cm in diameter
- Major ulcer: >1 cm in diameter

Investigation:

- Biopsy occasionally necessary (as it can be associated with HSV)



Rx: **Date:** **Time:**

No single systemic treatment has proven affective

- **Triamcinolone acetonide cream 0.1% (Kenalog, TRITON)**
  Apply locally-TDS: for 7 days **OR**
  Fluocinonide ointment 0.05%
  Apply locally-TDS for 7 days

If recurrent:

- 1 week tapering course of prednisolone (40-60mg/day)

Tab prednisolone 5mg (Deltacortil, Rapicort)

3+0+3 - 1 day
3+0+2 - 1 day
2+0+2 - 1 day
2+0+1 - 1 day
1+0+1 - 1 day
1+0+0 - 2 day

- **Cap omeprazole 20mg (Zolbi, Omezol)**
  1+0+1 before meal 7 days or till taking steroids
- **In H/V patient:** Thalidomide

ORAL CANDIDIASIS (Thrush)

Chief Complaint:

- Creamy white Patches in tongue & buccal mucosa
- Fluctuating throat or mouth discomfort
- In pharyngeal candidiasis: odynophagia
- In esophageal candidiasis: Dysphagia

Past Hx (risk factors): Diabetes mellitus, anemia, HIV, poor oral hygiene, Drug: Steroid use, chemotherapy, broad spectrum antibiotic use.

O/E: Erythema of oral cavity or oropharynx with creamy white crud like patches

- Easily rubbed off (e.g., by tongue depressor)

Investigation:

Not necessary usually as diagnosis made clinically
HIV by ELISA: In Patients with no know predisposing cause for candidiasis

Rx: **Date:** **Time:**

- **Nystatin oral drops (Nilstat)** 1ml (20 drops) in tongue 4 time daily - 7 days

In resistance case or immunosuppression

- **Cap Fluconazole 150mg (Diflucan)**
  1+0+0 - 4 days **OR**

Tab Ketoconazole 200mg (Ketowell, Ketorals)
200-400 mg with breakfast 7-14 days

If Fluconazole refractory cases; then

Cap Itraconazole 100mg (Icon, Rolac)
1+0+1 for 7 days

EPISTAXIS

Chief Complaint:
- Nasal bleeding
- Bleeding from one or both side of nose
- Common site: Anterior septum (Kiessel bach plexus)

Past Hx:
- Nasal trauma (nose picking, foreign bodies, forceful nose blowing)
- Nasal infection, Hypertension, Bleeding disorder
- Inhaled nasal cocaine, Alcohol abuse
- Drug: Anti-platelet & anticoagulant

O/E: Vital (Pulse, BP, Temp)
- Look for any local trauma to nose

Investigation:
1) CBC with ESR,PT, aPTT
2) X ray Paranasal sinuses

Rx: **Date:** **Time:**
- Pinching to the nose through thumb & index finger for about 10 minutes
- Cold Compression to the nose

If not controlled:
- **Inj. Transemic acid (Transamine) 500mg**
  1 vial IV stat if not controlled give 2nd dose of injection
  If still not controlled
  Nasal packing (Refer to ENT ward)
- **Tab Fexofenadine 120mg (Fexet, Fexo) 1+0+0 10days**
- **Xylometazoline 0.1% (xynosine) Nasal spray** 2 puff in each nostril TDS - 10 days or
  Nasal saline should be applied to nasal packing daily
- **Tab Cefuroxime 500mg (Zinacef, Zecef)**
  1+0+1 10 days

Advice: Avoid straining and vigorous exercise
Avoid hot & spicy food, Stop smoking & Alcohol AND Avoid nose picking

OTMYCOSIS

Chief Complaint:
- Itching in ear with or without pain
- Ear blockage

O/E:
- Vitals (Pulse, BP, Temp) JACKLET
- Grayish white fungal debris with or without black specks.

Investigation: **CBC, RBS**

Rx: **Date:** **Time:**
- **Clotrimazole 1% ear drop (Fungin, Clotrim)**
  3 drops-TDS for at least 7 days after Clinical resolution
- **Tab Flurbiprofen 100mg (Froben)** 1+0+1 7 days
- **Cap Esomeprazole 20mg (Nexum)** 1+0+1 7 days
- **Tab Fexofenadine 120mg (Fexet)** 0+0+1 - 10 days

Advice; Regular ear toilet by suction /dry mopping / instrumentation

EXTERNAL OTITIS/ EAR FURUNCULOSIS

Chief Complaint:
- Painful erythema & edema of the ear canal Skin
- Pain: May be exacerbated by moving the tags or opening of jaw
- edema and purulent discharge, ear blockage

Past HX: DM+, Steroid therapy, HIV, Hx of recent water exposure (Swimmer's ear) & Scratching, cotton applicators

O/E: Vitals (Pulse, BP, Temp)
- Tenderness, Regional lymphadenitis, Purulent exudate

Investigation: RBS (to exclude Diabetes)

Rx: **Date:** **Time:**
- **Advice:** protection of ear from moisture
  Avoidance of injury by scratching.
- **Tab Ciprofloxacin 500mg (Ciproxin, Cipval)**
  1+0+1 7 days
- **Gentamicin 0.3% ear drop (Genticyn, optagen)**
  3 drop TDS - 7 day,
- **Cap Esomeprazole 20mg (Nexum, Ezomol)**
  1+0+1 – before meal for 7 days
- **Tab Flurbiprofen 100mg (Froben, Ansaid)**
  1+0+1 - 7 days
- **Tab Fexofenadine 120 mg (Fexo, Fexet)** 0+0+1 10 days
- Application of hot Compresses.

ACUTE OTITIS MEDIA

Chief Complaint:
- Otalgia, fever, headache
- Aural pressure
- Decrease hearing

O/E: Vitals (pulse, BP, Temp)
- Erythema and decrease mobility of tympanic membrane

Investigation:
1) Tympanic membrane is dull, Congested & retracted
2) CBC , RBS, X-rays mastoid
3) Can lead to tympanic membrane perforation

Rx: **Date:** **Time:**
- **Tab Co-Amoxiclave 1gm (Augmentin)** BD 10 days
- **Tab Flurbiprofen 100 mg (Froben, Ansaid)**
  1+0+1 - 10 days (if pain present)
- **Cap Esomeprazole 20mg (Ezomol, Nexum)**
  1+0+1 before meal 14 days
- **Ciprofloxacin Dexamethasone ear drop (Cipotic-D)**
  2 drops in each TDS - 10 days.

If recurrent Otitis media:
Tab Sulfamethoxazole 500mg P/O - 1-3 months **OR**
Cap Amoxicillin 250/500mg (Amoxil, Ospamox)
1+0+1 - BD or TDS - for 1-3 months

CHRONIC OTITIS MEDIA

Chief Complaint:
- Discharge of pus (purulent) through ear
- Chronic Otorrhea with/without otalgia
- Pain is uncommon except during acute exacerbations
- Hearing impairment (conductive hearing loss) and Tinnitus
- Feeling blockage

O/E: Vitals, JACKLET
- If TT variety: Perforation in central part of TM
- If AA variety: Perforation in attic region

Investigation:
- CBC, RBS, Pus for Culture/Sensitivity
- X-ray mastoid (Towne's views)

Definitive management:
Surgical (in most of the cases)

Rx: **Date:** **Time:**
- **Tab Ciprofloxacin 500mg (Novidat, Ciproxin)**
  1+0+1 - 14 days
- **Tab Cefuroxime 500mg (Zinacef)** BD 10 days
- **Ciprofloxacin + Dexamethasone ear drop (Cipotic-D)**
  2 drops in affected ear TDS - 15 days
- **Tab Flurbiprofen 100mg (Froben, Ansaid)**
  1+0+1 - (If pain present)
- **Tab Fexofenadine 120mg (Fexet, Fexo)**
  0+0+1 - 10 days
- **Cap Esomeprazole 40mg (Nexum)** OD 7days

Advice:
- Use earplug to protect ear from water entry
- Regular removing of infected debris
- Avoid pricking in ear
- No swimming in the pond
- Use all Soaked Cotton after bath

Tinnitus

Definition: The Sensation of noise in the ear in the absence of an exogenous Sound (noise) Source it may be continuous or intermittent and more apparent in quite

Chief Complaint:
Perception of abnormal ear or head noises
- With or without deafness.
- Aggravated by fatigue, stress, depression

Rx: **Date:** **Time:**
Avoid: Exposure to excessive noise, ototoxic agent, avoid anxiety
- No specific treatment.
- Masking the tinnitus: with music or through amplification of normal sound.
- **Tab Nortriptyline 50mg (SENSIVAL)** 0+0+1 (at night) 3 months

ALLERGIC RHINITIS

Chief Complaint:

- Sneezing, itching, Burning, watery nasal discharge, eczematous dermatitis
- Nasal obstruction (felling of obstruction)
- Congested nasal mucosa, eye irritation.

H/O: Allergic conjunctivitis, Bronchial asthma

Advice:

- Bed rest
- Drink plenty warm fluid
- Avoid allergens (reduce exposure to airborne allergens)

Rx: **Date:** **Time:**

- **Tab Montelukast 10mg (Montika)**
  0+0+1 (at night) for 1 month
- **Tab Loratidine (Lorin-NSA, Softin)**
  0+0+1 (at night) 10 days
- **Tab Flurbiprofen 100mg (Froben, Ansaid)**
  1+0+1 - (If pain present)
- **Fluticasone 150mg (Flexonase, Avamys) nasal spray**
  2 puff + 2 puff - in each nostril - 1 month

If no response to above Treatment: then

- **Tab prednisolone 5mg (Rapicort, deltacortil)**
  2+0+2 - 7 days.
- **Cap Omeprazole 40mg (Zolbi)** OD 7 days

IMPACTED WAX

Chief Complaint:

- otalgia (earache)
- Itching, deafness
- Blockage of affected ear

O/E:

- By Otoscope
- Hard (dark brown) wax or
- Soft (yellowish) wax

Rx: **Date:** **Time:**

- **Soda glycerin (wax-aid)**
  5 drops 5 times daily for 5 days **OR**
  Olive oil 3-4 drops in affected ear TDS - 10 days
- **Tab Fexofenadine 120mg (Fexet, Fexo)**
  0+0+1 - 10 days
- **Tab Cetirizine 10mg (Rigix)** 0+0+1 - 10 days
- **Tab Flurbiprofen (Froben, Ansaid)** 1+0+1 (for pain)

ACUTE RHINOSINUSITIS

Definition: Inflammation of mucosal Lining of sinus usually associated with Rhinitis acute onset of symptoms (between 1 & 4 weeks duration)

Chief Complaint:

- Frontal headache, facial pain or pressure over the affected Sinus or Sinuses
- Pain typically worse on movement / bending
- Purulent yellow-green nasal discharge
- Nasal obstruction or congestion"
- Fever, headache, otalgia, dental pain, fatigue

Hx of: Upper RTI, tooth infection

O/E: Vital (Pulse, BP, Temp)

- ➢ Catarrhal Sinusitis: congestion & edema of mucosa Cause obstruction & Sinus drainage (viral)
- ➢ Supportive Sinusitis: Accumulation of pus within Sinus (bacterial)
- ➢ Pus in the middle meatus, Tenderness over sinuses

Investigation: (Not usually done)

X-ray PNS (para-nasal sinuses)/ CT PNS

Rx: **Date:** **Time:**

- **Tab Co-amoxiclave 625mg (Augmentin)**
  1+1+1 - 7 days
  or/If penicillin allergic or hepatic impairment:
  Cap Doxycycline 100mg (Vibramycin)
  1+1 - 7 days (be erect for at least 30 mins)
- **Tab Flurbiprofen 100mg (Froben, Ansaid)**
  1+0+1 - 7 days
- **Cap Esomeprazole 20mg (Nexum, Ezomol)**
  1+0+1 - 7 days
- **Tab Fexofenadine + pseudoephedrine 120mg (Fexet-D, Telfast-D)** 0+0+1 - 10 days
- **Oxymetazoline 0.05%. nasal spray (xynosine)**
  2 puff + 2 puff + 2 puff - each nostril - 10 days

FURUNCULOSIS OF NOSE / VESTIBULITIS

Furunculosis (localized): Staphylococcal infection of hair follicle in vestibule
Vestibulitis: Inflammation of skin in vestibule

Chief Complaint:

- Severe pain and swelling of Nose
- Purulent discharge if ruptured
- Diffuse redness and excoriation of the skin
- Headache, malaise, fever

O/E: Vitals (Pulse, BP, Temp)

- Tenderness over the tip of nose
- Congestion and Swelling of the vestibule

Date: **Time:**

Rx:

- **Tab Co-amoxiclave 625mg (Augmentin)** 1+1+1 - 10 days
- **Tab Cephradrine 500mg (velocef, Lecef)** 1+0+1 - 7 days
- **Tab Flurbiprofen 100mg (Froben, Ansaid)** 1+0+1 - (for pain)
- **Cap Esomeprazole 20mg (Nexum, Ezomol)**
  1+0+1 (30 mins before meal) 7 days
- **Tab Fexofenadine (Fexet, Fexo) 120mg**
  0+0+1 (at night) 10 days

VERTIGO

Definition: Hallucination of movement and Subjective sense of motion either of patient or surrounding (False sense of movement) or exaggerated sense of motion in response to movement

Chief Complaint:

Peripheral:

- Sudden onset & associated with
  Tinnitus, hearing loss, horizontal Nystagmus

Central: Gradual in onset

- No auditory symptoms
- ❖ Spinning Sensation or sense of falling forward or backward.

O/E: Vital (Pulse, BP, Temp) JACKLET

Investigation:

1) **CBC, RBS**
2) Audiogram & electronystagmography (ENG)
3) Video nystagmography (VNG)
4) MRI head
5) Dix-Hall Pike test, Rotation chair test

Associated Symptoms (Any)

Aural: Fluctuant deafness + Tinnitus + discharge (Meiners)
Neurological; LOC, weakness, numbness, dysarthria, cervical or visual symptoms

Causes: (See History of vertigo for more detail)

Benign paroxysmal positional vertigo (BPPV): Is a disorder arising in the inner ear. Its symptoms are repeated episodes of paroxysmal, positional vertigo (with horizontal Nystagmus and vomiting)

Rx: **Date:** **Time:**

- **Tab Beta Histidine 8mg, 16mg (Serc, Enier)**
  1+0+1 — OD or BD - 14 day **OR**
  Tab Prochlorperazine maleate (Stemetil) 5mg 1+0+1
- **Cap Ginkgo Biloba Extract 120mg (Ginbex)**
  1+0+1 - 1 month
- **Tab Domperidone 10mg (Motilium)** 1+0+1 - 14 days
- **Tab Mecobalamin 500mg (Neuromet, Mabil)**
  1+0+1 - 1 month
- **Tab Multivitamin (Chewcal)** OD 1 month

For BPPV: The Epley maneuver or repositioning maneuver is a maneuver used to treat (BPPV of the posterior or anterior canals)

Follow up: After 14 days.

- Find and treat the cause

Important to note:

Tab Betahistine Dihydrochloride 8mg (serc) 2+2+2 with meal – 14days
(Initial dose: 16mg TDS with meal, then maintenance dose in the range of 24 to 48 mg daily. Dosage should be alter according to clinical response **OR**
Inj. Prochlorperazine 12.5mg (Stemetil) (only once in ER) then can switch to ORAL tablet but continuous therapy with this drug is not recommended

Difference in central and Peripheral vertigo	
Peripheral (Vestibular)	**Central (cerebellum / Brainstem)**
Positional adaptation seen	Not seen
Nystagmus only during attacks	Always
Fast component of Nystagmus away from affected side AND Deafness, Tinnitus can occur	Fast component of Nystagmus to affected side No Deafness. Tinnitus,

DENTISTRY

GIGIVITIS/TOOTHACHE

Chief Complaint:

- Teeth or tooth pain (Toothache)
- Gingivitis: inflammation of gingiva
- Enlarge & painful gingiva

O/E In case of gingivitis: Enlarge, deep rid gingiva with Shiny surface

Causes for toothache

Cavity, Abrasion, Attrition, Erosion, Periodontitis, maxillary sinusitis, Trigeminal neuralgia, acute Alveolar abscess

Rx: **Date:** **Time:**

- **Tab Ciprofloxacin 500mg (Cipval, Novidat)**
  1+0+1 - 5 days **OR**
  Cap Amoxicillin 500mg (Amoxil)
  1+1+1 - 5 days
- **Tab Flurbiprofen 100mg (Froben, Ansaid)**
  1+0+1 -5 days
- **Cap Esomeprazole 20mg (Nexum, Ezomol)**
  1+0+1 - 7 days

Refer to dentist: For Specific management

DENTAL CARIES

Chief Complaint:

- Tooth decay or Dental Cavities
- Asymptomatic in early stage
- Tooth Sensitivity & toothache

Diagnosis

- Patient history
- Visual examination
- Radiographs

Refer to dentist

For proper management

Rx: **Date:** **Time:**

Tab Flurbiprofen 100mg (Froben, Ansaid)
1+0+1-(At the time of pain)

- When carries occur there is no way to reverse it either you can arrest it or get fillings
- **Sodium fluoride mouth wash (protect, Listerine)**
  Take 10m/ and rinse mouth thoroughly for 1 minute then expectorate - Repeat twice daily
- **Chlorhexidine mouth wash (Enziclor, Clinica)**
  10ml - rinse mouth for 1 min - BD

DENTAL PLAQUE

Chief Complaint:

- Sticky coating of bacteria that form on the teeth
- Usually, asymptomatic

Rx: **Date:** **Time:**

- **Bennet mouth wash** (Triclosan: 0.1%., Na monoflurophosphate) take & risen mouth thoroughly for one minute Twice daily
- **Bannet-Z toothpaste** (Triclosan + zinc citrate)
  Brush teeth Twice - daily
- **Xpert tooth whitening drops**
  Brush teeth thoroughly after meal or twice daily
  - ❖ Refer to dentist for scaling & Polishing

Ophthalmology

ANTERIOR BLEPHARITIS

Sub-acute or chronic inflammation of the eyelid margins, which can be infective and non-infective

Chief Complaint:

- Irritation, Itching, Lacrimation, Gluing of eyelashes, Photophobia, Deposition of dandruff-like scales on eye lids.

O/E:

- Red and edematous lid margins.
- Crusts found centered on eyelash base, while eyelashes are mattered in severe case (infective).
- Dandruff like flakes with shiny waxy lid margins, and greasy eye lashes.

Rx: **Date:** **Time:**

- Eyelids scrubbing with 25% baby shampoo (or Johnson baby shampoo) twice a day.
- **Blephamide eyes drops** 5 times a day for 5 days
- **Tab Cetirizine 10mg (Rigix)** 1 tab at night 5 days
- Tobramycin **Ointment (Tobrex, Eyebrex)** 2 drops in each eyes TDS
- Fluorometholone eye drops **(FML, Eyefem, Femicon)** 2 drops each eye TDS
- **Artificial tears (Tear Plus, Tearkool, Hyspa)** 2 drops each eye TDS

POSTERIOR BLEPHARITIS (MEIBOMIANITIS)

Diffuse inflammation of the inner edge of eyelids or meibomian glands characterized by hypersecretion of the gland.

Chief Complaint:

- Burning sensation in eyes due to hyper secretion

O/E:

- Foamy secretions on lid margins & canthi.
- Capping of meibomian glands by oil globules.
- Oily secretion when meibomian glands are massaged.

Rx: **Time:** **Date:**

- **Cap Doxycycline 100mg (Vibramycin)** 1+0+1 for 1 month **OR** **Tab Erythromycin 400mg (Erythrocin)** 1+0+1
- **Eyelid hygiene**
- **Fluorometholone eye drops (FML)** 2 drops QID
- **Artificial tears (Tear Plus, Tearkool, Hyspa)** 2 drops each eye TDS

ACUTE DACRYOCYSTITIS

Definition: Acute inflammation of the lacrimal sac.

Chief Complaint:

- Pain, erythema, and edema over the medial canthus

O/E: Painful, red swelling at medial canthus.

➢ Epiphora Mucopurulent or purulent discharge at Medial canthus.

Rx: Time: Date:

- **Tab Co-Amoxiclave 625mg (Augmentin) 1+1+1 FOR 6 days**
- **Tab Flurbiforen (Froben)** 1+0+1

❖ **Hot fomentations.**

❖ DCR is performed when acute inflammation has subsided.

BACTERIAL CONJUNCTIVITIS

An acute inflammation of conjunctiva characterized by mucopurulent discharge and redness of eye.

Chief complaint:

- Acute onset of redness.
- Foreign body sensation.
- Burning and discharge.
- Matting of eyelids on waking at morning

O/E:

➢ Mucopurulent discharge.

➢ Conjunctival hyperemia.

➢ Maximal redness at fornix and palpebral conjunctiva.

➢ Mattered eyelashes.

Rx: Time: Date:

- Conjunctival irrigation with Normal saline

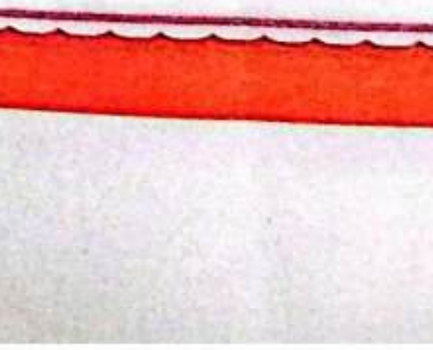
Topical antibiotics:

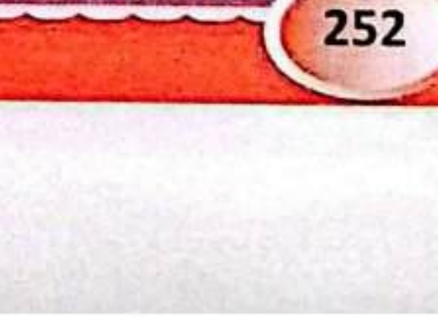
Chloramphenicol/Gentamycin/Ciprofloxacin/ Ofloxacin/ Moxifloxacin

- **Moxifloxacin eye drops (Moxion, Vegamox)** 1 drops each eye 6 times a day for 1-2 weeks

Antibiotic ointments: used at nights (bed time)

- **Tobramycin ointment (Tobrex)** at night
- **Tab Flurbiprofen (Froben)** 100mg BD 3 days
- Resolution within a week.





VIRAL CONJUNCTIVITIS

An acute inflammation of conjunctiva characterized by watery discharge and redness of eye.

Chief complaint:

- Acute onset of watering.
- Discomfort and photophobia.
- Pharyngitis, headache, fever

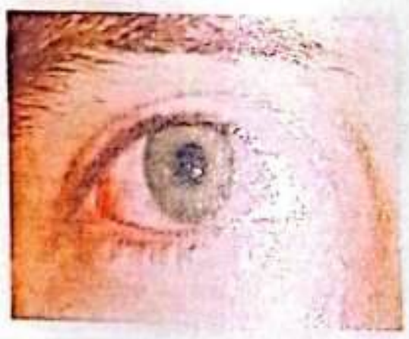
O/E: Pre-auricular Lymphadenopathy

- Watery discharge, Eyelids edema.
- Conjunctival hyperemia.
- Chemosis of conjunctiva, Sub Conjunctival hemorrhage in severe cases.
- Follicles in palpebral conjunctiva and fornix.
- Keratitis, Lymphadenopathy.

Rx: **Time:** **Date:**

- **Cold water application**
- **Sodium Hyluronate (Hylo)** eye drop 2 drop QID
- **Tab Cetirizine 10mg (Rigix)** 1 tab at night 5days
- **Artificial tears (Tear Plus, Tearkool, Hyspa)** 2 drops each eye TDS

❖ Advice photo grass glasses
❖ Resolution within 1-2 week.
❖ Antiviral only in HSV infection



ALLERGIC CONJUNCTIVITIS

An acute inflammation of conjunctiva characterized by itching and redness of eye

Chief Complaint:

- Itching, redness, Sneezing and nasal discharge
- Lacrimation, photophobia, burning.
- Foreign body sensation increased blinking

O/E: Conjunctival hyperemia.

- Papillae develop in cobblestone fashion.
- Sticky mucoid exudate, ropy secretion.
- Tarantas dots on limbus.
- Keratoconus is common

Rx: **Time:** **Date:**

- **Olopatadine eye drops (Zolopat)** 2 drops 4 times a day for 5 days
- **Fluorometholone eye drops (FML, Eyefem)** 2 drops QID
- **Tab Cetirizine 10mg (Rigix)** 1 tab at night 5days

Advice:

- Allergen exposure minimized
- Cold compression
- Photo gray glasses

PTERYGIUM

A degenerative condition in which a triangular fibro vascular connective tissue overgrowth arises from conjunctiva to the cornea.

Clinical features:

- Develops in patients living in hot climates.
- Fibro vascular growth in triangular shape on the limbus with its apex towards the cornea.
- Visual can be deteriorated by mechanical obstruction or by development of astigmatism.

Stages:

1. Extends less than 2mm over the cornea.
2. Extends 4mm over the cornea.
3. Extends more than 4mm over the cornea consuming the pupil.

Rx: Time: Date:

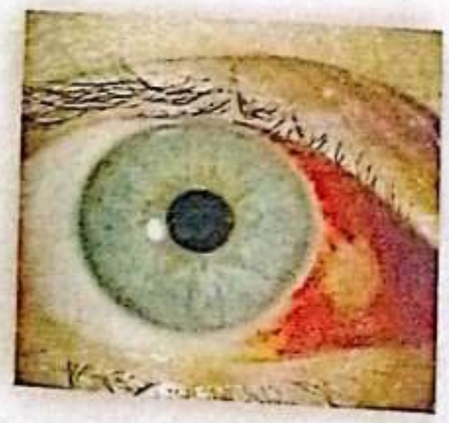
- **Artificial tears (Tear plus eyes drops)**
  2 drops each eyes TDS
- **Fluorometholone eye drops (FML, Eyefem)** 2 drops QID
- **Lotiprednol etabonate (Lotional eye drop)** 1 drops TDS then taper every 10 days
- Sunglasses, Surgical excision

SUBCONJUNCTIVAL HEAMORRHAGE

Bleeding from the Conjunctival vessels into the space between conjunctiva and sclera.

Clinical features:

- Benign and asymptomatic until noticed by patient or others around him/her.
- Bright red/ dark red patch on sclera.



Rx: Time: Date:

- Self-limiting condition, spontaneous resolution within 1-2 week.
- Avoid hot compression/massage
- **Artificial tears (Tear plus eyes drops)**
  1 drop each eye QID

In mild to moderate case:

- **Moxifloxacin + dexamethasone (Oxcin-D) drops**
  1 drop 6 time a day for 1 week

Massive hemorrhage: Evacuation plus antibiotic

- **Tab Co-Amoxiclave 625mg(Augmentin)** TDS **or**
  Tab Ciprofloxacin 500mg(Cipval) BD for 5 days

KERATOCONUS

A progressive ectatic dystrophy of the cornea characterized by central or paracentral corneal thinning accompanied by apical protrusion and irregular astigmatism

Chief Complaint:

- Painless gradual deterioration of vision (D+N).
- Sudden visual loss in case of corneal hydrops.
- Photophobia.
- Monocular diplopia/ ghost images.

O/E:

- Visual aquity is reduced due to myopia and astigmatism.
- DDO shows 'oil droplet reflex'.
- Munson's sign (bulging of lower eyelid when the patient looks down).
- Scissor's reflex on retinoscopy.
- Thinning and bulging of cornea, Vogt's lines, and prominent corneal nerves on slit lamp examination.
- Fleischer's ring around the base of the cone (iron deposition).

RX: DATE: TIME:

- Spectacles to correct refractive errors.
- RGP contact lenses to correct irregular high astigmatism.
- CXL is done to stop the progression.
- Keratoplasty.

PTOSIS

Abnormal drooping of eyelid.

Chief Complaints:

- Skin eyelid crease is absent.
- Ptotic lid is higher than normal in down gaze.
- Complete ptosis associated with restricted ocular movements and dilated pupil (neurological cause).
- Ptosis may be variably fatigued and worse in evening and associated with diplopia (Myogenic cause).

Investigations:

- Tensilon test or ice pack tests.

Rx: Time: Date:

- Surgery.

UVEITIS (ACUTE IRIDOCYCLITIS)

Definition: Acute inflammation of the iris and Cilliary body

Chief Complaint:

- Sudden onset of pain typically worse at night.
- Decreased vision, Photophobia, Lacrimation.
- Redness of the eye.

O/E:

- Visual Aquity is reduced and Circumcorneal congestion.
- Keratic precipitates on cornea.
- Aqueous flare, cells and hypopyon in anterior chamber.
- Muddy appearance of iris (exudates).
- Posterior synechiae, Miotic pupil.
- Tenderness of eyeball

Investigations:

CBC, ESR, CPR, Blood sugar, ACE, OCT

RX: DATE: TIME:

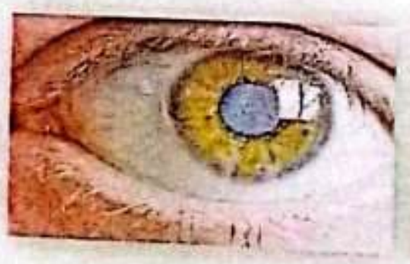
- **Cyclopenolate ophthalmic solution (Cyclopen)**
- 1 drop TID
- **Prednisolone acetate (Pred forte) eye drop)**
  1 drop TID or QID
- **Nepafenac (Nepanac eye drop)**
  1 drop TDS
- **Moxifloxacin (Vigamox eye drop)**
  1 drop TID
- NSAIDS and systemic steroids

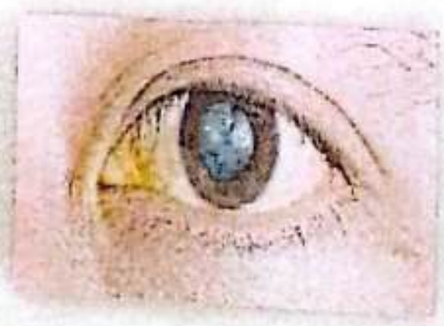
CATARACT

Opacification of eye's natural crystalline lens.

Chief Complaints:

- Decreased vision
- Leukocoria
- Abnormal eye movements, Squint, Nystagmus in congenital cases





- Types:
  - Capsular
  - Sub capsular
  - Cortical
  - Supra nuclear and nuclear
  - Congenital
  - Acquired

Rx: Time: Date:

Surgical removal of opacified lens.

RETINOBLASTOMA

Congenital malignant tumor of sensory retina.

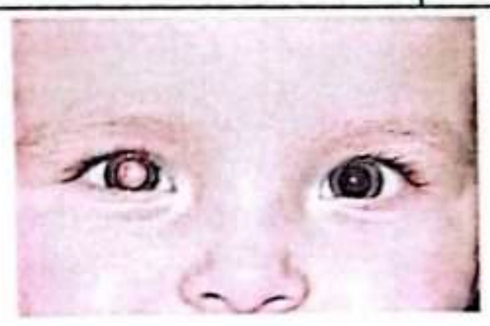
O/E:

- Leukocoria
- Squint
- Decreased vision
- Extension of tumor outside of eyeball in severe cases.

Investigations: X- Ray orbit, Ultrasonography, CT scan, MRI, Bone marrow biopsy.

Rx: Time: Date:

- Chemotherapy
- Trans pupillary thermotherapy (TTT)
- Photocoagulation, Cryotherapy. Enucleation



REFRACTIVE ERRORS

When parallel rays of light are not focused on retina the condition is called refractive error.

Types Refractive errors:

1) Myopia 2) Hypermetropia 3) Astigmatism

Chief Complain:

- Blurry vision for near or distance.
- Headache / asthenopia.

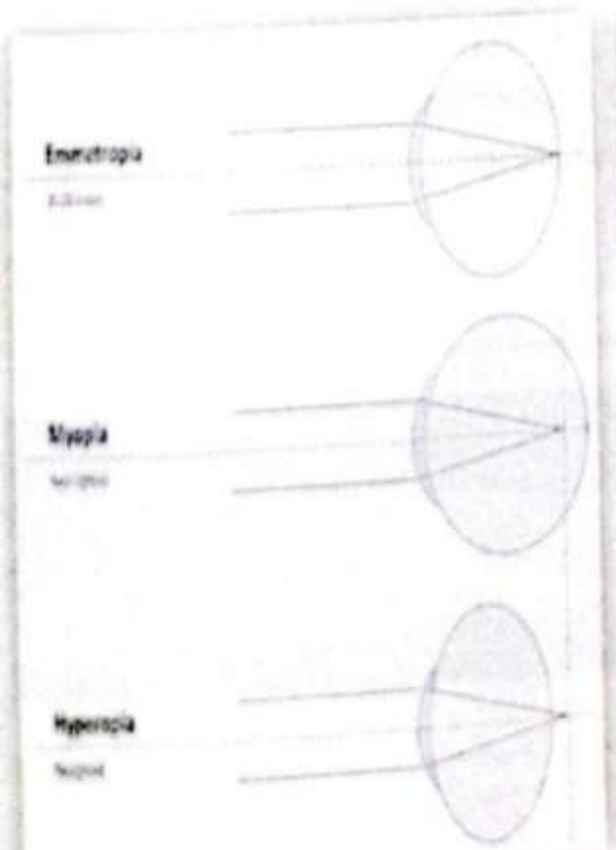
O/E: Reduced visual acuity.
Reduced Contrast sensitivity.

Investigations:

1) Auto refraction, Retinoscopy

Rx: Time: Date:

- Correction with spectacle lenses.
- Correction with Contact lenses.
- Refractive surgery.



SQUINT

Misalignment of eyes (visual axis) is called Strabismus or squint.

Chief Complaint:

- Deviated eyes.

O/E:

- Reduced stereopsis and binocular functions.
- Misaligned eyes.
- Remote near point of convergence and accommodation.
- Diplopia (binocular/ monocular)
- Suppression / amblyopia

Types of strabismus:

1) Manifest and latent squints.
2) Esotropia, Exotropia, Hypertropia, Hypotropia.
3) Paralytic and non-paralytic
4) Mechanical and neurological squints

Investigations:

1) Cover tests,
2) Prism cover tests,
3) Binocular vision tests.

Rx: **Time:** **Date:**

- Amblyopic therapy.
- Orthoptic exercises.
- Surgical alignment of eyes.

DIABETIC RETINOPATHY

Non inflammatory disease of retina characterized by dysfunction of retinal vasculature secondary to hyperglycemia.

Types:

1) Background DR. **2)** NPDR **3)** PDR **4)** ADED

Chief Complaint:

- Progressive loss of vision.

O/E:

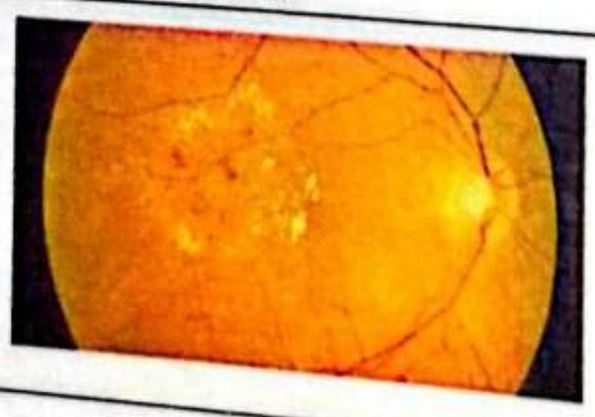
- Reduced visual acuity, Microaneurysms
- Retinal edema, Exudates, Cotton wool spots
- Retinal hemorrhages, Retinal new vessels
- Venous changes
- Neovascular glaucoma, RD, vitreous hemorrhage in advanced cases.

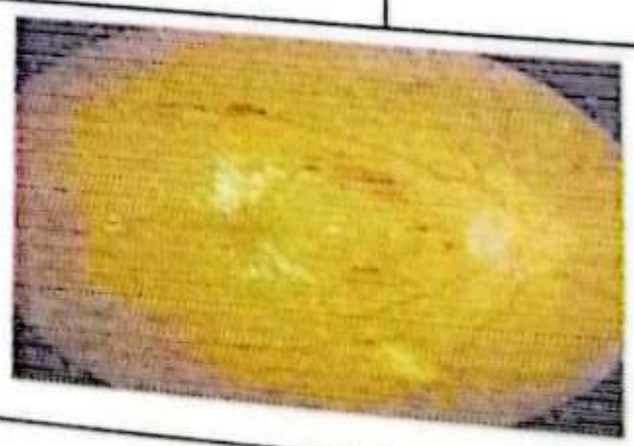
Investigations:

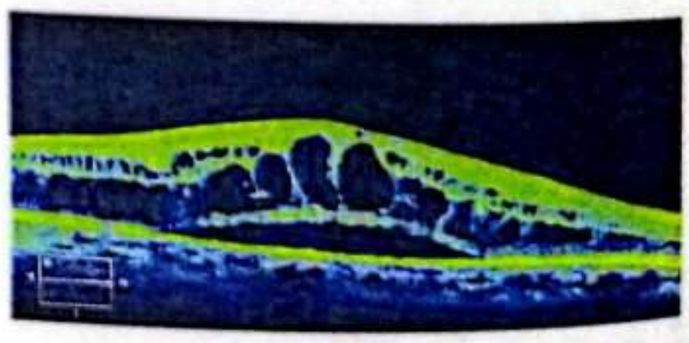
1) Fundoscopy, OCT, FFA,
2) HbA1C, Lipid profile

Rx: **Time:** **Date:**

- Anti VEGFs:
  - ✓ Bevacizumab (Avastin)
  - ✓ Ranibizumab (Lucentis)
- Laser photocoagulation
- Surgery: PPV.







Surgery

Appropriate suture materials:

- Scalp: Silk 2-0 cutting body
- Extremity/ abdomen: Prolene 2-0 cutting body
- Back: Prolene 1-0 cutting body
- Face: Prolene 3-0/4-0 cutting body

Time for suture removal:

Skin: 2/0-5/0	**Scalp**: 5-7 days	**Face neck** : 2-5 days	**Back & chest**: 7-10 days
Abdomen & upper extremities:10-15days	**Distal extremities; 15-20days And Hands: 7-10days**	**Flexor crease or Extensor crease**: 10-14 days	

HEAD INJURY

Chief Complaint:

- H/O head injury, unconsciousness at any time since injury?
- Amnesia for the incident or subsequent
- Severe, persistent headache, nausea, vomiting? Bleeding from nose/ear?
- Seizures or presence of black eye?

O/E:

- Vitals, GCS, and JACKLET, RACOON eyes:
- Battle sign (after 8-12 hours).
- CSF Rhinorrhea or of Otorrhea.
- Halo sign (blood Stain Surrounded by a yellowish Stain (CSF) which is usually seen on blood linensor pillows):

Indication of CT scan of head:

1. GCS<13 at any point
2. GCS 13 OR 14 at 2 hours
3. Focal neurological deficit
4. Suspected open, depress or basal skull fracture
5. >1 episode of vomiting
6. Any patient with a mild head injury > 65 years or with a coagulopathy for instance warfarin use, should be scanned urgently.
7. Dangerous mechanisms or injury or antegrade amnesia >30 minutes warrant CT within 48 hours.

Rx: Date: Time

- **Diet** NPO TFO (no per oral till further offer)
- **Inf. NS 1L** IV @10 drops/min
- **Inj. Ceftriaxone 1 gm (Oxidil, Rocephin)** 1 amp IV stat and BD (ATD)
- **Inj. Ketorolac 30mg (Toradol)** 1 amp IM stat and TDS
- **Inj. Omeprazole 40mg (Risek, Ruling)** I vial IV stat and BD
- **Inj. Dexamethasone 4mg/ml (Decadron)** IV stat and TDS And TDS No role but given conventionally
- **Inj. Ondansetron 8mg/4ml (ONSET)** 1 amp IV stat and TDS
- **Inj. Metronidazole 100ml (Flagyl)** 1 vial IV stat and TDS

If there are laceration/incised wound then add:

Inj.Tetanus toxoid (TT) IM stat in one arm

IF raised ICP (Hypertension, Bradycardia, Papilledema)

Ensure catheterization & add

Inj. Mannitol 20% 300 ml IV running stat

Then 150 ml running TDS for 3 days

[0.25-1 g IV every 3 to 4 hours

If patient is restless

inj. Haloperidol 5mg/ml (Serenace) IM stat

ANAL FISSURE

Definition: Anal fissure is longitudinal split in the lining of distal anal canal extending from anal verge to dentate line. 90 % located in midline posteriorly.

Chief Complaint:

- Severe pain on defecation that is sharp/cutting /tearing in nature and aggravated by constipation.
- Bleeding is usually small and occurs as a streak by the side of stool.
- A foul smelling discharge is present in chronic cases Pruritus may be also present

O/E: Vitals

on local examination

- A longitudinal ulcer is seen in the midline posteriorly that maybe covered by a skin tag
- Local inflammation and indurations.

Investigation:

1) **CBC (Hb)**
2) **RBS**

Rx Date: Time:

- **Diet:** Avoid Spicy or fatty food
  And increase fluid, high fiber diet
- **Syp. Lactulose (Duphalac)**
  2TSF+ 2TSF + 2TSF
- **GTN Forte Ointment 25gm Or Fissuride cream**
  Apply 2 times daily for one month
- **CONDRET Sachet** BD or Isphaghul hash
- **Tab Metronidazole 400mg (Flagyl)**
  1+ 1+1 for 5 days
- **Tab Diclofenac Na 50mg (VOREN)**
  1+ 1+1 (for pain)

ANAL FISTULA

Chief complaint:

- Persistent or intermittent discharge that may be blood stained
- Pain and itching around anus
- Sometimes a history of a perianal abscess that has been drained
- Past history: HTN.DM, TB, Syphilis, Irritable bowel syndrome, malignancy. pervious surgery

O/E: Vitals , Local examination

- Usually an opening within 3-4 cm of the anal orifice with granulation tissue
- DRE (Digital Rectal Examination): May reveal the internal opening.
- Low level fistula: Opens into the anal canal below the anorectal ring
- High level fistula: Opens into the canal at or above the anorectal ring

INVESTIGATION:

1) **CBC ,RBS**
2) **Fistulography**

Rx Date: time:

- **Cap. Cefexime 400mg (Cefiget)**
  1+0+1 for 10 days
- **Tab. Metronidazole 400mg (Flagyl)**
  1+1+1 for 7 days
- **Cap. Omeprazole 20mg (Zolbi)**
  1+0+1(30 minutes before meal) 14 days
- **GTN Forte Ointment 25gm &/Or Fissuride cream**
  Apply locally TDS
- **Tronolane cream (Local Anesthetic)**
  Apply locally 15 minutes before defecation for symptomatic relief
- **Tab Diclofenac Na 50mg (VOREN)**
  1+ 1+1 (for pain)
- **Syp Laxoberon 2 TSF TDS** (If Constipation present)

Definitive Management: Surgical

- Fistulotomy.
- Fistulectomy
- Seton suture replacement

HAEMORRHOIDS/PILES

Hemorrhoids are the part of normal anatomy of anal canal and they are the cushions of sub mucosal tissue containing venules, arteries, smooth muscles and they function as a part continence of anal canal & aid in complete closure of anal canal at rest.

Chief complaint:

- Many small size hemorrhoids are asymptotic
- Bright red, painless bleeding during defecation
- In chronic cases: anemia

❖ **First degree hemorrhoids:** no prolapse
❖ **2nd degree hemorrhoids:** prolapse has to be which reduced spontaneously
❖ **3rd degree hemorrhoids**: prolapse has to be reduced manually
❖ **4th degree hemorrhoids:** remain prolapsed permanently

Post Hx: previous surgery, Diabetes, Hypertension

O/E: Vitals, JACKLET

➢ Digital rectal examination (DRE)
➢ No external evidence if hemorrhoids in early cases.
➢ In advanced cases, hemorrhoid can be seen on Straining or are constantly prolapsed.

Investigation:

1) **Protoscopy** (for internal hemorrhoids)
2) **Flexible Sigmoidscopy** (to exclude proximal disease)
3) **CBC (Hb), RBS**

Rx Date: Time:

Grade I (or first degree):

- **Diet:** Avoid Spicy or fatty food, & NSAIDs And increase fluid, high fiber diet
- **Syp. Na Pico sulphate (Laxoberon)** 2TSF+ 2TSF + 2TSF
- **GTN Forte Ointment 25gm** Apply 2 times daily for one month
- **CONDRET Sachet** BD or Isphaghul hash
- **Tab Diclofenac Na 50mg (VOREN)** for pain

Grade II or Grade III:

Sclerotherapy, band ligation

Grade III(very symptomatic) and Grade IV:

Surgical Hemorrrhoidectomy

Grade IV, Internal Hemorrhoids or any gangrenous or incarcerated tissue:

Prompt Surgical consultation

ACUTE CHOLECYSTITIS/ CHOLELITHIASIS

Definition: Acute cholecystitis occurs due to impaction of stone at gallbladder neck following obstruction of cystic duct the gallbladder becomes hyperemic, edematous, tense & distended.

Chief complaint:

- Right upper abdominal pain which radiate to tip of shoulder or inferior angle of scapula.
- Anorexia, nausea, vomiting and fever.
- Mild jaundice may be present.
- Past Hx : if any

O/E: Vitals, JACKLET

➢ Boas sign: (hyperesthesia of skin below the scapula)
➢ Per Abdomen : Murphy's sign + tense, distended, palpable gallbladder

Investigation:

1) CBC (leukocytosis), ESR, LFTs, RFTs,
2) USG Abdomen
3) Radionuclide scan (HIDA scan): Useful if diagnosis is uncertain after ultrasound

Rx Date: Time:

Hospital/ER:

- **Inj. Omeprazole 40 mg (Risek, Ruling)** 1 vial IV stat & OD
- **Inj. Cefuroxime 750 mg (Zinacef)** 1 vial IV stat & TDS (only in admitted patient)
- **Inj. Ondansetron 8mg (Onset)** IV stat & TDS
- **Inj. Drotaverine 40mg (Nospa)** IV stat & TDS
- **Inj. Ketorolac (Toradol)** 30mg IV stat & TDS

Home Treatment:

- **Tab Cefuroxime 250mg (Zinacef)** 1+0+1 for 7 days
- **Tab diclofenac Na 50mg (Voren)** 1+1+1 for pain
- **Cap Esomeprazole 20mg (Nexum, Ezomol)** 1+0+1 before meal for14 days
- **Tab Drotaverine 135mg (Colofac)** 1+1+1 3 days

Definitive management: cholecystectomy after 6 weeks of initial attack

CHRONIC CHOLECYSTITIS

Definition: It is a pathological term & not a clinical diagnosis. Patients with symptomatic gall stones have chronic cholecystitis

Chief complaint:

- Recurrent attack of upper abdominal pain radiating to the tip of shoulder.
- Nausea, vomiting, dyspepsia.
- Pain increase with heavy meal.
- Past Hx: if any

O/E: Vitals, JACKLET

Investigation:

1) CBC, RBS, Serum Electrolyte
2) USG Abdomen, CXR AP view
3) Urine R/E, ECG, serum creatinine
4) HBs Ag, anti HCV, LFTs
5) Blood group & cross match

Rx **Date:** **Time:**

- Same treatment as acute cholecystitis

Treatment of choice: cholecystectomy

Rx on discharge (Home treatment):

- **Cap cefuroxime 500mg (Zinacef)**
  1+0+1 for 7 days
- **Tab tramadol+ paracetamol (Tonoflex-P)**
  1+1(for pain)
- **Cap Esomeprazole 40mg (Nexum, Ezomol)**
  1+0+0 before breakfast 14 days
- **Tab multivitamin (Chewcal, Vitrum)**
  1+0+0 1 month.

ACUTE PANCREATITS

Ranson criteria to predict severity of acute pancreatitis (causes other than gall stones)

0 HOUR		SCORE
Age	>55 years	1
WBC count	>16K	1
Blood glucose	>200mg/dl	1
LDH	>350U/L	1
AST	>250 U/L	1
48 HOURS		**SCORE**
Hematocrit	Fall by ≥ 10%	1
BUN	↑ By ≥ 5mg/dl despite fluid management	1
Serum calcium	<8mg/dl	1
PO2	<60mmHg	1
Base deficit	>4 MEq/L	1
Fluid sequestration	>6000 ml	1

If the score ≥ 3: Severe pancreatitis likely **if the score<3:** Severe pancreatitis is unlikely **Or**
Score 0-2: 2% mortality, Score 3-4: 15% mortality, Score 5-6: 40% mortality, Score 7-8: 100% mortality

ACUTE PANCREATITIS

Definition: It is an acute inflammation of the pancreas (and sometime adjacent tissues)

Chief complaint:

- Acute epigastric pain which is constant increasing intensity with radiating to back.
- nausea and vomiting
- Features of jaundice if there is edema of head of pancreas.
- Left side pleural effusion may be seen.
- Hypovolemic shock with oliguria.
- **Past Hx:** see the causes of pancreatitis, ERCP

O/E: Vitals, JACKLET

On abdominal examination:

- **Collen sign;** A faint bluish discoloration around umbilicus due to hemoperitoneum.
- **Gray turner's sign**; Bluish discoloration of flanks
- Generalized abdominal tenderness due to chemical peritonitis
- Bowel sound absent/quite (paralytic ileus develop)

Investigation:

1) **Serum lipase:** 3 fold elevation (+ in 70-85%of cases) High in alcohol associated pancreatitis
2) **Serum Amylase; 3 fold elevation** (+ in 85% of cases) Higher in gall stone pancreatitis **(we routinely advice this to make Diagnosis)**

Other lab:

1) **USG** - gall stone pancreatitis swelling
2) CBC,CRP, Serum electrolyte, Calcium, Albumin
3) **CT abdomen;** contrast enhanced spiral CT Pancreatic swelling. CT is the best imaging.

Hypocalcemia caused primarily by precipitation of ca++ soaps in the abdominal cavity.

Rx **Date:** **Time:**

- Admit the patient
- **Diet:** NPO (no per oral)

(in the absence of nausea, vomiting for ileus pain, oral feed can be initiated
Early within 24 hours -as tolerated)

IV fluid 5 to 10 ml/kg/hour:

- Inf. NS 500ml + 500ml RL IV TDS or 30drops/min continues

Analgesic:

- **Inj. ketorolac 30mg(Toradol)** IV stat and TDS and SOS

Morphine is contraindicated

Anti-emetic and PPI:

- **Inj. Ondansetron 8mg (Onset)** 1 amp IV stat & BD
- **Inj. Omeprazole 40 mg (Risek, Ruling)** 1 vial IV stat & OD

Antibiotic:

- **Inj. Ceftriaxone 2 gm (Oxidil, Rocephin)**
  1 vial IV stat and BD (ATD)

Alternate antibiotics: cefuroxime 1.5gm IV TDS

If hypocalcemia (tetany):

- Inj. Calcium gluconate 10% 1gm/10ml
  1 amp in 100 ml pladyx iv over 10 mins

If hyperglycemia: Then can use regular insulin

In patients with Gallstones with increase bilirubin: ERCP

Rx on discharge:

- **Tab Cefexime 400mg (Cefiget)**10 days **Or**

Tab cefuroxime 500 mg (Zinacef) BD for 7days

- **Tab tramadol+ paracetamol (Tonoflex-P)**
  1+1(for pain)
- **Tab Ondansetron 8mg**(Onset) TDS
- **Cap Omeprazole 40 mg (Zolbi) OD**

Summary of Management: 1) **NPO:** (no per oral) till further order
2) **FLUID:** Aggressive hydration of isotonic Crystalloid solution (e.g, NS or RL) 20 ml/kg fluid given over 30 minutes followed by 5 to 10 mL/kg/hour for 8 to 12 hours. Adequate fluid replacement can be assessed by an improvement in vital signs (goal heart rate <120 bpm and reduction in hematocrit (35 to 44% and blood urea creatinine over 24 hours
3) **ANALGESIA:** Pethidine,Tramadol (Morphine is contraindicated) ,fentanyl(20 to 50 micrograms intravenous)
4) **ANTIBIOTIC:** (Only useful in infective cases) Prophylactic antibiotics are not needed in patients with acute pancreatitis regardless of the type (interstitial or necrotizing) or disease severity Meropenem 1 gm IV TID or Imepenem + Cilastatin 1gm TID useful in 2ndry bacterial peritonitis.
5) **Calcium and magnesium:** checked frequently in the first 48 to 72 hours and especially with aggressive fluid resuscitation. Hypocalcemia (signs are present or ionize ca^{++} is low) should be corrected, Low magnesium levels also cause hypocalcemia and should be corrected.
6) **Blood sugar levels**: Should be monitored hourly in patients with severe pancreatitis and hyperglycemia (blood sugar>180mg/dL) should be treated with insulin as it can increase the risk of secondary pancreatic infections

PAEDIATRICS

PAEDIATRICS

GEANRAL ASPECTS

Fluid Requirement

Term Baby

Age	(ml/Kg/Day)
D_1	60
D_2	80
D_3	100
D_4	120
D_5	140
D_{6-7}	150
Upto 9 months	150-160
Upto 12 months	120-150
Upto 2 yrs.	100-120
Upto 4 yrs.	90-100
Upto 8 yrs.	70-90
Upto 12 yrs.	60-70

In preterm baby:
Above amount + 20 ml

Types of Fluid:
Day 1- Day 2: **10% DEXTROSE (DS)**
D3-1 year: 5-10% DS in 0.225%NS
1 year-10 years: 5% Ds in 0.45%NS
>10 years: 5-10% DS in 0.9%NS

ACCORDING TO WEIGHT
100ml/kg for 1st 10Kg +
50ml/kg for next 10 kg +
25ml/kg for rest
e.g. weight = 35 kg
1st 10 kg- 1000ml+ 2nd 10kg- 500ml+ Rest 15 kg- 375ml = 1875 ml

MOBILE TRANSFUSION
Amount of blood= (Wt. in kg x 20) ml [20ml/kg] to be given in 4 hours
Each 20ml consists of: 3ml Anti-coagulant + 175 ml blood
In case of heart failure: Packed cell to be given @ 10ml/kg

Fluid Rate Calculation

IV Fluid in drops = $\frac{Amount\ of\ fluid\ in\ ml}{4\ X\ Time\ in\ hours}$ D/min

IV Fluid in micro drops = $\frac{Amount\ of\ fluid\ in\ ml}{hours}$ µD/min

Shortcut calculations: For drops:

1. The amount fluid (in ml) to be administered in 24 hours, divide it by 100 e.g. If 1400 ml fluid to be infused in 24 hours, no. of drops/min= (1400+ 100) = 14 drop/min OR
2. Amount of fluid in liter in 24 hours will be (10Xnumber of liters) drops/min. e.g.
   1L in 24 hours= 10 drops/min
   2L in 24 hours= 20 drops/min
   3L in 24 hours= 30 drops/min

Blood transfusion note (BTN NOTE)
Patient Name:
Patient Blood Group:
Recipient No:
Lab Reference No:
Recipient Blood Group:

Blood Transfusion Order:
One unit of fresh cross matched blood is to be transfused, first start transfusion @ 5 drops/min & observe for few minutes if no reaction then transfuse @ 10 drops/min
In case of neonates: 4 drops/min as blood volume is small
Notes: In case of any reaction stop transfusion & call on duty doctor
Inj. Hydrocortisone 100mg (Hyzonate) IV stat
Inj. Avil 1 amp 1/M or IV Staff

NEONATOLOGY

Criteria of a healthy new born

- Gestational age: 37-42 completed weeks and Birth weight: 2500-3999g
- Length: 50 cm (Approximately)
- Colour: Pink. Slight peripheral cyanosis soon after birth is considered normal.
- Breathing Spontaneous, regular and rate 30-40 breath/min
- Heart rate: 100-160/min, Axillary temperature: 97.5-99ºF
- Normal muscle tone with a flexed position, Able to suck soon after birth
- Passage of urine: within 24 hours (But upto 48 hours is considered normal)
- Passage of meconium: within 24 hours
- Sleep: Around 18hours/day and Good primitive reflexes and No congenital anomaly

UNWELL CHILD

1. History of Perinatal aspyxia, birth injury, low birth weight 2. Convulsion 3. Respiratory difficulty
4. Cyanosis 5. Poor primitive reflexes e.g. moro reflex 6. Unable to suck
7. Server abdominal distension

ADMISSION CRITERIA IN NICU

1) Weight <1800g 2) Gestational age: <34 weeks 3) Major congenital malformation
4) Perinatal aspyxia 5) Breathing difficulty 6) Suspected early onset neonatal sepsis
7) Neonatal jaundice requiring phototherapy or exchange transfusion
8) IDM baby requiring IV glucose infusion
9) Post-operative new born requiring intensive care

GNERAL PROFORMA FOR HISTORY TAKING OF A NEONATE

Anti-Natal history (ANH)	**Post-Natal Histroy (NNH):**	**Peri-Natal History (PNH):**
Age of mother: ANC: Yes/No No. of pregnancy: TT. inj: Yes/No	Date of delivery (DOD): Time of delivery (TOD: Mode of delivery (MOD): Place of delivery (POD): Gestational age(GA):Preterm Prolonged / Obstructed labour PROM: Yes/No	Delayed crying: Yes/No Convulsion: Yes/No

General Examination:

- **Appearance:** Normal/ Ill looking/ excessive crying/ gasping/ coma
- **Color:** Pink / central Pink, Peripheral cyanosis/ Cyanosed/ pale
- **Temperature:**
- HR: Normal 100-180 beat/min, murmur, RR: Normal 30-60 breath/min
- **Lungs:** Clear/ Creps, any other added sound **Muscle tone:** Normal/ Hypo or Hypertonic
- **Reflex:** Good/ Moderate/ Poor, **Fontanilla:** Normal/ Bulged/ Depressed
- Congenital anomaly:

CHILD FEEDING

- **1st 6 moths:** Colostrum is the first effective vaccine.
  Exclusive breast feeding is gold standard
- **6th to 8th month:** Breast feeding **plus**
  - Smashed/liquid family food like rice, vegetables, pulses, fish, meat (mixed): 3 servings plus
  - Fruits juice (Home made)
- **9th months to 12th months:**
  - 5 servings of family food including 2 -3 staple food (3 meals + 2snacks)
  - Snacks: e.g. noodles, banana, firni, payesh, egg, halwa, sewaya etc.
  - Breast feeding will be continued
- **By 3 years:** Accustom to family foods and stop breast feeding.

INFANTILE COLIC

Infantile colic can be distressing to parents whose infant is inconsolable during crying episodes.

Colic is often defined by the "rule of three":

1) crying for more than three hours per day,
2) for more than three days per week, and
3) for longer than three weeks in an infant who is well-fed and otherwise healthy.

Treatment:

- **Lactase enzymes(colibid drops) drops** 5 drops +5 drops +5 drops
- **Beta-D-Galactosidase(Colic-EZ) drops** 5 drops +5 drops +5 drops

Note: The physician's role is to ensure that there is no organic cause for the crying, offer balanced advice on treatments, and provide support to the family.

PESPIRATORY DISTRESS SYSNDROME (RDS)

Definition: Previously called idiopathic respiratory distress syndrome it is now known to be due to deficiency of substance called Surfactant, which reduce surface tension

Chief Complaint:

- Respiratory distress within first 4 hour after birth (Respiratory difficult shortly after birth)
- Tachypnea, expiratory grunting, inspiratory recession of the stream and intercostal spaces, flaring of alainasi & cyanosis
- Edema of the feet, hypothermia & jaundice may also appear

Hx; Ante-natal, Post-Natal & Peri-Natal history

General Examination:

Appearance, Cyanosis: Present

HR: Tachypnea (>60 /minute), expiratory grunting and sternal and intercostal recession present,**RR, Temp, Heart& Lungs examination**; **Muscle tone, Reflex, Fontanilla**

Investigation:

1) **CXR: Early:** Reticulogranular pattern, motting
   Late: Air bronchogram

Ground glass appearance: The air in the trachea and bronchi stand out as dark shadow & called air bronchogram

Rx Date: Time:

- **O_2 inhalation STAT AND SOS**
- **OP suction** (If meconium stained /SOS)

If presented within ½ hour of delivery:

- **Intrathecal surfactant** (4ml/kg in 4 divided doses)

If significant respiratory distress, hypoxemia, hypercarbia or acidosis:

- Ventilatory support or CPAP
- New techniques of minimal invasive surfactant therapy (MIST) are being practiced and infants are kept on CPAP, intubated for surfactant instillation followed by immediate extubation & CPAP is continued.
- Manual ventilation should not be used for repeat closes of surfactant.

UMBILICAL SEPSIS

Chief Complaint:

- Foul smelling purulent, sometime serosanguineous discharge
- Redness in surrounding skin
- Feature of septicemia e.g. fever, vomiting, reluctant to feed, lethargy etc. may be present

O/E: vitals (Pulse, RR, HR, temp)
Appearance: Normal/ ill looking/ excessive crying/ gasping/coma
Color: Pink/ central pink, peripheral cyanosis/ Cyanosed /Pale
Lungs: Clear/ Creps, any other added sound
Muscle tone: Normal/Hypo or Hypertonic
Reflex: Good/ Moderate/ Poor
Congenital anomaly:
Investigation:

1) **CBC**

Rx: Date: Time; Weight:

- Clean the cord with Pyodine daily
- Umbilical gel : apply daily
- **Oinment Muporicine (Mupir)**
  Apply locally TDS for 10 days

If localize infection:

- **Cefaclor 50mg/ml (Ceclor) drops 5+5+5**

If associated with systemic infection/septicemia:

Inj. Claforan or Fortam ± gentamicin or Amikacin

- **Inj. Cefotaxime(Claforan)** 100mg/kg/day if age is less than 7 days then BD and if more than 7 days then In 3 divided doses (IV TDS) **or**
  Inj. Ceftazidime (Fortam) 100mg/kg/day
  PLUS/minus
  Inj. Amikacin (Grasil) 7.5mg/kg IV BD
  [15mg/Kg/DAY]
  - ❖ Advice regular mother feed

MECONIUM ILEUS (MI)

The group of diseases referred to as meconium syndromes of infancy include meconium ileus, almost always as part of cystic fibrosis, meconium plug syndrome and meconium peritonitis. Thick meconium obstruct ileum "Intestinal obstruction"

Chief Complaint:
Hx: ANH, NNH, PNH
General Examination:
Appearance, Color, HR, RR, Temperature:
Muscle tone, Reflex, Fontanilla
Congenital anomaly:
Bowel sound: Early stage: Audible: Late stage: Diminished/ absent
Investigation:

1) Plan X-ray abdomen:Hazy or ground glass appearance in Rt lower quadrant small bubbles of gas trapped in meconium
2) sweat chloride / Na test

Rx: Date: Time:
Conservatively:
daily airway clearance,chest physiotherapy,antibiotics,supplemtal enteric coated pancreatic enzymes along with multivitamins A,D,E,K.

- **Rectal wash**
- **Clean enema**
- **Glycerine suppository**
- **And tretament of underlying cause like cystic fibrosis or hypothyroidism etc**

PERINATAL ASPHYXIA

Chief Complaint

1. Baby hasn't cried since birth
2. Convulsion 3 times after birth

History: ANH, NNH, PNH

General Examination:

- **Appearance:** Normal/ Ill looking/ excessive crying/ gasping/ coma
- **Color:** Pink / central Pink, Peripheral cyanosis/ Cyanosed/ pale
- **Temperature:**
- HR: Normal 100-160 beat/min, murmur RR: Normal 30-60 breath/min
- **Heart:** NAD/ Any positive finding
- **Lungs:** clear/ Creps
- **Muscle tone:** Normal/ Hypo or Hypertonic
- **Fontanelle:** Normal/ Bulged/ Depressed

Investigation:

1) Serum Ca^{++}, serum magnesium
2) RBS, Serum electrolytes, Serum urea, Creatinine
3) Sepsis screening: CBC, CRP, blood culture.

Monitoring:

- Respiratory rate, rhythm & pattern
- Cyanosis, Heart rate, BP, Blood glucose, ABG

Control of convulsion in HIE-II

Inj Barbit 200mg/1ml + 9ml d/w (loading 1ml/kg) wait for 15 min, if not controlled then
half loading (0.5ml/kg) wait for 15 min, if not controlled then add inj Fosfen 150mg/2ml+8ml (loading 2 ml/kg
Wait for 15 min, if not controlled then half loading (1ml/kg)
If convulsion free for 48 hours

1. Omit fosfen first & observe 48-72 hours
2. If no convulsion, then start Tab Barbit 30mg 0+0+1/4 for 6 weeks

PNA with HIE (Perinatal asphyxia with Hypoxic Ischanemic Encephalopathy):
Only delayed crying= Stage I
I+ convulsion = Stage II
II+ Lethargy/coma= Stage III

Rx: **Date:** **Time:** **weight:**

- **OP suction** (If meconium stained /SOS)
- **O2 inhalation** Start & continuous /SOS
- **Inf.** IV @ µD/min
- **Inj.cefotaxime (claforan)** 250mg/5ml IV 50mg/kg/dose or
- **Inj. Ceftazidime (fortum)** 250mg/5ml 100mg/Kg/DAY]
- **Inj. Amikacin (grasil) 100**mg/2ml 7.5 mg/kg/dose BD
- **Inj. Vit+K** 2mg/0.2ml 1 amp IV/PO stat

If there is Convulsion:

Inj. Phenobarbitone 200mg/1ml + 9 ml D/W
20mg/Kg stat & 2.5mg/kg BD

If Convulsion not controlled:

P/A:
Inj. Phenobarbitone 200mg/1ml + 9 ml D/W (Wt/2) ml IV stat [Half loading dose] [Can be repeated once]

If patient develops distended abdomen:

Cause: Neurogenic bladder due to Phenobarbitone
Rx: Evacuate the bladder by pressing on the abdomen

If hypoglycemia (Glucose <40mg/dl):

Inf. 10% dextrose saline 10ml
IV @60 micro drops/min stat [2ml/kg]

If signs of shock (Capillary repill time (CRT): > 3 secs, low pulse volume, low BP):

- **Inf. Normal saline** 10ml/kg over 30 minutes
- **Inj. Dopamine 200mg/5ml 0.5ml** in each 100 of fluid

Rx on discharge:

HIE stage I: No discharge medication
HIE stage II/ III:
Tab phenobarbital 30mg (phenobarb)
0+0+1/3 –
HIE; Hypoxia ischemic encephalopathy

NEONATAL JAUNDICE

Definition: Yellow discoloration of the skin, sclera, mucous membrane. (discerniable at a level; 4-6mg/dL)

Physiological jaundice

1. Jaundice appear on 2nd or 3rd day of life
2. Bilirubin level reach to 12mg/dl in full term body and 15mg/dl in present babies
3. Jaundice disappears by 10-12 days (mostly 7 10 day) in full term & 14 day in pre-term
4. Bilirubin level rise slowly (<0.5mg/hour)
5. Baby remain otherwise healthy

No need of Tx

Pathological jaundice

1. Jaundice in the first 24 hours of life
2. Persistence of jaundice for mother than 2 weeks in term and > 3 weeks in preterm babies or rise fast (10mg/dl/day)
3. Serum bilirubin > 15mg/dl by 48 hours
4. Jaundice ≤ any sign of sepsis and with pale stool
5. Jaundice extending up to palm and sole

Need Tx: see below

Chief complaint: (Pathological Jaundice)

- Yellow discoloration of body history
- Age of appearance of jaundice
- Issue: Increased rise of Rh incompatibility in 2nd and subsequent pregnancy
- Hx of previous sibling < neonatal jaundice or death in neonatal period
- Hx of delayed passage of meconium
- Blood grouping of parents

O/E: Vital: (Pulse, Temp Hx, RR),

- Appearance, CVS, Muscle tone, Reflex:

Investigation

1. **Serum Bilirubin** (Total, direct and indirect)
2. **Blood grouping Rh typing** (baby & mother)
3. **Sepsis screening** (see neonatal sepsis)
4. **CBC, Direct coombs test, and indirect**
5. **TSH,G6pd if male**

Rough Examination of Bilirubin Level

- 4-6mg/dl: Face
- 8-10mg/dl: Chest and upper abdomen
- 12-14mg/dl: Lower abdomen and thigh
- 15-18mg/dl: Arms and legs
- 15-20mg/dl: Palm and sole

Rx: **Date:** **Time:**

- **Phototherapy:** Stop phototherapy when bilirubin <50 µmole/L
- **Tab Phenobarbital 30mg** 2 tab on day one then half tab daily for 7 days (mix with water) syrup debritone 20 mg/5ml (prescribe by some pediatricians)
- **Vit D (D Max drops)** 2 drops daily
- **If weight <1.5:** Keep the baby in incubator
- If Rh, ABO /minor blood group incompatibility **IVIG (500mg/kg over 4 hours)**

IV Antibiotics: if the cause sepsis:

- **Inj. Cefotaxime (Claforan)** 250mg/5m L IV 50mg/kg/dose
- Inj amikacin(grasil) 100mg/2ml@ 7.5mg/kg/dose

❖ **Ensure adequate hydration**

❖ **keep the baby warm**

❖ If Rh negative mother of Ph Positive baby **Inj. Anti-Dig 250-300mg (Rhophylax)** within 72hours of child birth or abortion

Indication of Exchange transfusion

1. If intense phototherapy has failed to reduce bilirubin level to a safe range
2. If the risk of kernicterus excess the risk of procoding
3. If initial bilirubin level is too high
4. Prematurity, sepsis, hypoxia and cyanosis

NEONATAL SEPSIS / SEPTICAMEIA

Definition: Invasive bacterial infections that involve primarily the blood stream in neonate
Early onset Sepsis: Implies infection in the first week (or within the first 72 hours)
Late onset Sepsis: Onset of infection beyond 7 days of age (or at 4-28 days of life)

Chief Complaint

- Refusal to feed or suck
- Inactivity or lethargy (common)
- Vomiting and diarrhea, convulsion
- Fever, respiratory distress, apnea, jaundice

O/E: Vital (Pulse, HR, RR, Temp),

- Appearance, CVS, Chest, Reflex, Fontanilla
- Blooding, Skin pustules, Peri umbilical redness or draining pus
- Poor/ Bigh pitched cry, Chest indrawing,

Investigation

1) Definitive test for diagnosis
   CSF Study: In LONS(late onset neonatal sepsis) and EONS(early onset neonatal sepsis) if baby have convulsion
   - **Most Definitive: Blood culture**
   - Culture of CSF/ urine, abceses
2) Supportive Test
   - CBC with Peripheral smear : ≥ 2 is + screen
   - Total leukocytes > 20,000 or < 5,000
   - Absolate neutrophil count < 1500/mm^3
   - ESR > 15 mm in 1 hour
   - Toxic granulation & vascuolisation of neutrophil
   - Platelet: Thrombocytosis
3) Serum Pro-Calcitonin
4) RBS. Electrolyte, S. creatinine, PT,INR, MRI brain
5) CXR (PA View): if respiratory finding present
6) Fibronectin, low, C3, low
7) Elastase alpha protcinase: Rasied

Rx on Discharge

Cefaclor drops 50mg/ml (ceclor)
10-15 drops TDS

Rx: **Date:** **Time:**

- OP Suction (if meconium stained/ SOS)
- O_2 inhalation stat, continuous/ SOS
- **Inj Vit K (K-Lot)** 2mg/0.2ml 1amp IV stat
- Inj cefatoxime (claforan) 250mg/5ml or
- **Inj. Ceftazidime(fortum) 250mg/5ml** 100mg/Kg/day
- **Inj. Amikacin (grasil) 100mg/2ml 7.5mg/kg/dose BD**
- **Keep the baby warm**
- If CRP > 6, change antibiotic & give:
- **Inj. Meropenem 500mg + 10ml Dextrose saline** @20mg/kg/dose TDS (60mg/Kg/Day TDS)
- **Inj. vancomycin 500mg10ml + 15ml normal saline** @10mg/kg/dose give slowly in 2 hours

Duration of antibiotic

- Risk factor positive only: 3 days
- Risk factor positive + screening positive: 5 days
- Screening is negative but clinically sepsis: 10 days
- Clinically sepsis & screening is positive for: 10 days
- Blood culture positive but no meningitis: 14 days
- Meningitis: 21 days

Discharge Criteria

- Feeds well
- Normal breathing
- Passes Normal Stool
- No focal infection
- Baby sleeps b/w feeds
- Micturition frequency > 6 time/day
- Maintain temperature
- Starts weight gaining

Mother is confident enough to take of the baby

LOW BIRTH WEIGHT BABY (LBW)

Definition: A body weighting less than 2500g at birth is termed as LBW
If less than 1500g are termed as very low birth weight infants (VLBW)

Chief complaint:

- Depend on duration of gestation & birth weight
- Low birth weight & premature delivery

Hx: ANH, NNH, PNH

General Examination:

Vital (Pulse, RR, HR, Temp)
Appearance, Color,
Heart: Examination, **Lungs:** clear/ Creps
Muscle tone, Reflex, Fontanilla, weight, age

Investigation:

1) **CBC, Peripheral Smear, IT Ratio**
2) **CRP, RBS**

Discharge Criteria

- Able to maintain temperature
- No apnoea and
- Able to take and tolerate full feeding from breast or cup spoon without respiratory discomfort
- Parient are confident enough to take care
- Crossed birth weight & show a steady weight gain for 3 consecutive days

Advice

- Examine the eyes of a baby
- Examine ears (hearing) by ENT specialist

Follow up: Growth monitoring, an acmia, Hearing, Rickets, and metabolic bone disesa, eyes examination

Indication for hospitalization	LBW= <2.5kg VLBW= <1.5kg Extremely LBW= <1kg Incredible LBW= <750gm
1. Birth weight < 1800g 2. Gestation <34 weeks 3. Not able to take feed from breast/cup and spoon 4. Any sick neonate irrespective of birth weight/ gestation	

RX: **Time** **Date:**

- **Breast Milk the key to survive**
- **O_2 inhalation** Start & continuous /SOS
- **OP suction** (If meconium stained /SOS)
- **Inf.10% DW**
- **Inj. Cefotoxime(Claforan)** 250mg/5ml
- (Wt in kg) ml IV start & BD **[100mg/Kg/Day]**
- **Inj.Amikacin (grasil) 100**mg/2ml @7.5mg/kg/dose BD

If there is Convulsion:

Inj. Phenobarbitone 200mg/1ml + 9 ml D/W
(Wt in kg) mlIV stat & (Wt÷8)ml IV BD [20mg/Kg stat & 2.5mg/kg BD]

Keep the baby warm:

- ✓ Wrap the baby with adequate clothing including cap and socks
- ✓ Keep the room ward (>25°C) [With room heater if needed]

Protection against Infection:

- ➢ Use hexisol before handling the baby
- ➢ Handle baby as minimal as possible
- ➢ Don't give prelacteal feed
- ➢ Keep the umbilical stamp bare, clean, dry
- ➢ Avoid over crowding
- ➢ If weight <1.5kg: keep baby in incubator

Rx and discharge:

From age at 15 days

- **Multivitamin drops (vidynil drops)**
  5 drops P/O once daily – 3 month
- **L-methylfolate +vit B12 (Thrito drops)**
  2 drops daily for 3 months

From age 45 days

- **Iron Polymatosa drop (Maltofer)**
  4 drops once daily – 3 months

INFANT OF DIABETIC MOTHER (IDM)

Chief Complaint:

Prone to develop hypoglycemia due to hypertrophied itself of Langerhans

- Large, Plumpy and plethonic face
- Pink color and rounded "moon" face giving a false appearance of being healthy
- Foetal macrosomia
- Lethargy, Poor feeding, apnoea
- Jaundic, convulsion
- Associated with: Respiratory distress syndrome, birth trauma, birth asphyxia, congenital Anomalies, VSD

Hx: ANH, NNH, PNH

General Examination:

Appearance: Plethoric fancies
Color: Pink /central pink, peripheral cyanosis
HR: Normal 100-160 beat /min
RR: Normal 30-60 breath /min
Temp, Lungs, Muscle tone,
Reflex, Fontanilla
Congenital anomaly:

Investigations:

1) **RBS:** At delivery, ½ hour, 2, 4. 8, 12, 24, 36 and 48th hours of age Or in suspected IDM cases the blood sugar level should be checked at 0.5, 1-2, 3, 6, 12, 24, & 48th hours of age
2) Serum cortisol level,
3) Serum insulin level,
4) CT scan of pancrease,
5) Screening for inborn error of metabolism

Rx: Date: Time:

Diet: Early start of EBF ½ hour after capillary blood glucose (CBG) measurement. If normal: Perform CBG 3-4 hourly 3-4 times

- **Inj. Cefotoxime(claforan) 250mg** @50mg/kg/dose BD **[100mg/Kg/D]**
- **Inj.amikacin(grasil) 100mg/2ml** @7.5mg/kg/doose BD **[15mg/Kg/Day]**
- **Inj. Vit K (K-Lot) 2mg** 1 amp IV/PO stat

Symptomatic hypoglycemia:

- **Inf. 10% DA 10 ml** IV @60 micro drops /min stat [2ml/kg @ 1ml/min] If convulsion present: [4ml/kg} **Then,**

In. 10% DA 10 ml [8ml/kg] IV @ micro drops/min

Target blood glucose: You can increase the rate to maintain blood glucose > 50mg/dl

Keep baby warm

Persistent hypoglycemia:

If hypoglycemia is not resolved by 7 days or baby needing > 12ml/kg/min

Please Add,

- **Inj Hydrocortisone 100mg+5ml DW**

(Wt/8)ml IV stat and BD [5mg/kg/day in 2 divided dose]

- **Inj. Glucagon 0.1mg/kg/dose iv or IM**

ACUTE EPIGLOTTITIS

Chief Complaint: Usually 2 – 4 years of age

- Sudden onset of high fever
- Sore throat and swallowing difficulty
- On laryngoscopy: Large, cherry red, swollen epiglottis

O/E: HR: Tachycardia, RR: Tachypnea, Temp;Raised Cyanosis: +, Appearance: Toxic, hyperextended neck with tripod position

Investigation:

1) **CXR PA view:** Hypertranslusecny,hyperinflation
2) **CBC with ESR:** Normal

Rx Date: Time:

- Propped up position
- **Inj. Ceftriaxone 500mg (Oxidil) +10ml Dextrose saline** ml IV stat and OD [50-100mg/Kg/D]

Closely observe for 24 – 48 hours

UPPER REPISRATORY TRACT INFECTION (URTI)

Clinical features;

- Fever
- Nasal blockage or runny nose
- Sore throat, Cough

On Examination;

- Nasal congestion
- Throat congestion
- Tonsil enlargement (+/--)
- Lymph node enlargement (+/--)

Investigation;

1) Nasopharyngeal swab for PCR
2) ASO titer, swab for C/S
3) X-Rays for sinusitis

Other anti-allergic;

Syp levocitrizine (T-Day syp) ½ tsf night
Syp Loratidine (syp Lorin-NSA) ½ tsf night

RX; TIME; DATE;

- **Syp Citrizine (Rigix)**
  ½ tsf if age < 5 years and 1 tsf if age > 5 years
- **Syp Paracetamol (Panadol, calpol)** 1 tsf TDS
- **Syp Coferb** (or any other cough syrup)
  ½ tsf TDS if age < 5 years, 1 tsf TDS if age > 5 years

If suspecting or bacterial infection; then also add

- **Syp Augmentin 156mg/5ml**
  40-50mg/kg/day in 3 doses or TDS **OR**
- **Syp Azithromycin 200mg/5ml (Azomax, Admira)**
  10mg/kg/day OD

In case of severe cough; also add

- **Syp Corex-D** ½ tsf BD
- **Montileukast sachet (Montika) 4mg**
  1 sachet in 1 tsf water OD
- **Atem plus clenil nebulization TDS**
- **Tab Betnesol 0.5mg** (Betamethasone)
  1 tab bd to be dissolve in water

LOWER REPISRATORY TRACT INFECTION (LRTI)

Chief complaint;

- Fever , Cough
- Breathing difficulty

On Examination;

- Respiratory distress
- Irritability, Nasal flaring,
- Tachypnea, tachycardia

Chest; B/L crepitation, wheezes, crackles

In case of severe cough; also add

- **Syp Corex-D** ½ tsf BD
- **Montileukast sachet (Montika) 4mg**
  1 sachet in 1 tsf water OD
- **Tab Betnesol 0.5mg** (Betamethasone)
  1 tab bd to be dissolve in water
- **Inj Dexamethasone (Decadron) 4mg**
  IV Half in morning, half in evening

Cough syrup are;

Syp Britanyl, syp muconyl, syp Accefyl

Other Oral Antibiotics;

Syp Cepodoxime (Abacus) 40mg/5ml

RX; TIME; DATE;

- Maintain Airway, breathing, circulation
- O2 inhalation state and sos
- Nebulization; Atem TDS plus Clenil OD at night

Antibiotics; Any of the following

- **Syp Kalithromycin (Klaracid)**
  15mg/kg/day BD 7days **OR**
- **Inj Cefotaxime 500mg (Claforan)**
  100-200mg/kg/day in 3 divided doses or TDS
  Inj Ampicillin/Cloxacillin (Amplus)
  100-200mg/kg/day in 3 divided doses or TDS **OR**
- **Inj Ceftazidime 500mg (Fortum)**
  100-150mg/kg/day in 3 divided doses or TDS
  Inj Linezolid 200mg, 600mg (Nezkil)
  30mg/kg/day in 3 divided doses or TDS **OR**
- **Inj Meropenem 500mg (Meronem)**
  60-120mg/kg/day in 3 divided doses or TDS

Anti-Allergic;

- **Syp Citrizine (Rigix)** ½ tsf if age < 5 years, 1 tsf if age > 5 years

Anti-pyretic/anagesic;

- **Syp Calpol or brufen or tempramine** 1tsf BD

Antitussive (Cough syrup);

- **Syp Coferb or Hylixia** ½ or 1 tsf BD

PMNEMONIA

Chief Complaint:

- Fever, cough , chest in-drawing
- Sometime Respiratory distress

O/E:

- **Appearance , temp; Raised, HR:** Tachycardia
- **Flaring of nose**: +, Cyanosis: +/-
- Respiratory rate: Fat breathing (≥ 60 (0 – 2 months, 50 ≥ 2-12 months, ≥ 40 1 – 5 years),
- **Chest indrawing**: +/-

Respiratory examination:

- Trachea: Central, Percussion; Dull, Breath sound: Bronchial over consolidation, Wheezing: +++, Crepitation: +

Pneumonia:

1) Fast breathing (> 60: neonates, > 50: 2months to 1 year, > 40: 1 – 5 years), **2)** Chest indrawing

Severe pneumonia:

1) Fast breathing: infant >70 & Children > 50
2) Any general danger sign(Convulsion, lethargic or unconscious, not able to drink or breastfeed, vomits everything),
3) Severe lower chest indrawing,
4) Stridor in calm child

Investigation:

1) **CXR PA view:** Homogenous opacity
2) **CBC:** Neutrophic leukocytosis
3) **Urine R/E, CRP, ESR, Sputum culture**

Dose of salbutamol: 0.15-0.3 g/kg/dose
1 nebule (3ml) = 2.5mg;,
1 ml resp soln = 5mg

Danger sings: Cyanosis , Unable to feed, Lethargy, Convulsion , Stridor in calm child, Unconsciousness, Very high respiratory rate (>70/min), Very severe persistent vomiting , Severe malnutrition

Rx **Date:** **Time:**

- O2 Inhalation stat and SOS
- Nebulization with Atem TDS+ Clenil OD
- If nebulization is not possible:
  Syp. Salbutamol 2mg/5ml
  PO stat and TDS [0.1mg/Kg TDS]
- **Inj. Hydrocortisone (Hyzonate)** 10mg/kg IV (if respiratory distress present)
- **Inj. Dexamethasone (Decadron)** 0.5-1cc/kg IV BD for 3 days

Antibiotic:

- **Inj. Cefotaxime(Claforan) 50**mg/kg/dose BD
  IF Age is less than 7 days and TDS if age is more than 7 days **plus**
  Inj. Ampicillin + Cloxacillin (Amplus)
  100-200mg/kg/day **(If patient is having diarrhea** instead of Amplus prescribe;
  Inj. Clarithromycin (Klaricid) 0.3cc/kg IV BD **or**
  Inj. Ceftazidime (Fortam) 100-200mg/kg/day
  In resistance:
  Inj. Amikacin (Gracil) 7.5mg/kg IV TDS

Cough Syrup:

Syp. (Acefyl) 1 tsf BD [for productive cough OR
Syp. Bronex 1 tsf BD [for dry cough]

Rx on Discharge /or TX for stable patient

Syp claritek dropper
4kg-1/2 dropper bd
6kg-3/4 dropper bd
8kg-1/2 tsf bd
Syp Clarithromycin (klaricid) 125mg/5ml
15mg/kg/day BD
Syp britanyl(terbutalin)
0.15mg/kg/day tds 5 days
Nebulisation.

PERTUSIS (Whooping Cough)

Rx **Date:** **Time:**

- Admit the patient, pass/secure IV line, cardiopulmonary monitoring
- Suction (if needed) then O2 inhalation stat and SOS
- Syrup Azithromycin (Macrobac) 10mg/kg per oral OD for 5 days
- Inj. Dexamethasone (Decadron) IV BD
- IF Patient having fits: then Inj. Midazolam (Dormicum) 0.2-0.5cc/kg IV stat and sos **OR**
- Syp Core-D ½ TSF BD, and Ventoline Nebulization TDS

BROCHILITIS

Chief Complaint

- Age upto 2 years, peak 2-6 months
- Rapid and shallow breathing
- Cough and difficulty in breathing for 3 day,
- Low grade fever,
- Feeding difficulty 6 hours

O/E:

- **Appearance :** well alert,
- **Temp; slightly raise**
- **Heart rate (HR):** Tachycardia
- **Respiratory rate:** Tachypnea

Respiratory examination:

- Barrel shape chest, Flaring of nose: +/-
- Breath sound: Vesicular
- Rhonchi/Wheeze. Present

Investigation: CBC, CXR, nasopharyngeal swab

Rx **Date:** **Time:**

- **Bed rest:** Propped up position
- **O2 inhalation** stat and SOS
- **Nebulization** with Salbutamol (Ventolin) ipratropium(Atem) or adrenaline
- **Inf. Plabolyte-M** (25ml/kg) IV TDS

Antibiotic: For 2ndry infection empirically

- **Inj. Cefotaxime (Claforan)** 100-200mg/kg/day in 3 divided doses

Other are: Amplus, Klaricid

If acidosis: give inj. sodium bicarbonate

Note:

- Steroids, sedatives, bronchodilators have no role in treatment so better avoid
- Clean nose with normal saline
- Bathing with lukewarm water

Acute exacerbation of bronchial Asthma

Chief Complaint:

- Runny nose and Cough for 3 days
- Difficulty in breathing for 2 days
- Past history: H/O same type of attach
- previously, eczema
- Family history: + Family History

O/E: HR: Tachycardia, RR: Tachypnea

- Temperature: Raised/normal, Cyanosis: +
- Appearance: Distressed

Chest:

- Flaring of nose: +/-, Chest indrawing:
- Breath sound: Vesicular with prolonged expiration , Ronchi: Present

Investigation:

3) **CXR PA view**: hyperinflation lung
4) **CBC with ESR**: Normal

Indications of antibiotic:

- ✓ Productive cough
- ✓ Continuous high fever > 3 days,
- ✓ Toxic child AND Lung crackles, Red throat

Rx on discharge:

- **Syrup. Levosalbutamol 1mg/5ml**
- 1 TSF TDS [0.1 mg/kg/dose TDS]
- **Inhaler. (Ipratropium bromide+Salbutamol) 20 mcg/100mcg** puff QDS and SOS with spacer
- **Tab. Montelucast 4mg**(Montika) OD

Rx **Date:** **Time:**

- **Bed rest;** Propped up position
- **O2 inhalation via Face mask** (Maintain spo2%; 94-98%)
- **Closely observe for 24 – 48 hours**
- **Fluid:** According to status of dehydration
- Nebulization:

  Salbutamol (Ventolin) diluted in 3-5 ml NS OR 2-6 puff by spacer Stat and repeat 2 times at 20 minutes interval if no improvement [dose; 2.5-10mg]

  Ipratorpium bromide (Atem) 150mcg/2ml PN initially 3 hours then TDS
- **Inj. Hydrocortisone 100mg (Hyzonate)** 10mg/kg/dose IV stat then 5mg/kg TDS
- **If infection is suspected:**

  Inj. Ceftriaxone 500MG (Oxidil) 50-100mg/Kg/D IV OD (ATD) **OR**

  Inj. Co-Amoxiclave (Augmentin) 20-30mg/kg/day in 3 divided doses

If still not improved:

- **Add Inj. Aminophylline**

If still not improved: Nebulization with Adrenaline and give Inj. MgSO4

In refractory cases:

Mechanical ventilation may be necessary

ACUTE WATERY DIAARHEA (AWD)

Chief Complaint: Loose stool, Fever, Vomiting, Nausea vomiting
O/E: Vitals (Heart rate, Respiratory rate. Temp), Appearance
Investigation: CBC, RFTs, Stool R/E, Serum electrolyte, CXR
Severe dehydration: Any 2 or more of the following signs
1) Lethargic, unconscious **2)** Sunken eyes **3)** unable to drink or drink poorly
4) skin pinch goes back very slowly (≥ 2 seconds)
Some dehydration: Any 2 or more of the following signs;
1) Restless, irritable **2)** Sunken eyes **3)** drink eagerly, thirsty **4)** skin pinch goes back slowly
No Dehydration: not enough sings to classify as some or severe dehydration
INDIATION OF ANTIIOTIC IN DIARRHEA:
1) Suspect cholera 2) Febrile patient 3) Throat infection

AWD with Severe Dehydration: **Rx:** **Time:** **Date:** **Weight:**

- **Inj. Ceftriaxone 500mg (Oxidil)** IV OD (ATD) [**Dose;** 50-75mg/kg]
- **Inf. Metronidazole 400mg (Flagyl)** 8CC IV TDS [**Dose:** 1.5CC or 7.5mg/kg]
- **Inf. NS** 20ml/kg IV stat then maintenance dose: according to body weigh IV TDS
- i.e, 100ml/kg: For first 10kg weight, 50ml/kg; for next 10kg then 20ml/kg for onward
- **Syrup Zinc** 10mg/5ml (Zincate, Zinc once) 1 TSF OD for 10 days
- **ORS;** Pedicare or Pedilyte
- **Enterogermina** or Biflor, Actiflor Sachet PO BD [for normal flora recovery]
- **Inj. Domperidone (gravinate)** 10mg IV SOS **OR Inj. Ondansetron 4mg (onset)** IV SOS
- **If fever:** Syrup Paracetamol 120mg/5ml (Calpol) 1 tsf TDS [Dose; 15mg/kg/dose QDS]
- IF Patient is too little to drink then Paracetamol drops (Panadol) 6 drops BD

AWD with Some Dehydration: **Rx:** **Time:** **Date:** **Weight:**

- Ideally should be treated with Oral Rehydration therapy (ORT) with 75ml/kg for 4 hours , then reassessed. But we modified the treatment as follow
- **Inj. Ciprofloxacin 200mg/100ml (Cipro)** 5 x weight ml IV sat & BD **OR**
  Susp. Azithromycin 200mg/5ml (Azitma) 1TSF for every 20kg OD 3 days [Dose; 10mg/Kg day]
- **Syrup Zinc** 10mg/5ml (Zincate, Zinc once) 1 TSF OD for 10 days
- **ORS;** Pedicare or Pedilyte
- **Enterogermina** or Biflor, Actiflor Sachet PO BD [for normal flora recovery]
- **If fever: Syrup Paracetamol** 120mg/5ml (Panadol) 1 tsf TDS [Dose; 15mg/kg/dose QDS]
- IF Patient is too little to drink then Paracetamol drops (Panadol) 6 drops BD

AWD with Some Dehydration: **Rx:** **Time:** **Date:** **Weight:**

- Counsel the patient party: There is no need to get admitted. I'll prescribe, you have to follow accordingly. With the grace almighty, everything will be fine
- **Susp. Azithromycin 200mg/5ml (Azitma)** 1TSF for every 20kg OD 3 days [Dose; 10mg/Kg day]
- **Syrup Zinc** 10mg/5ml (Zincate, Zinc once) 1 TSF OD for 10 days
- **Syrup Metronidazole (Metrozine)** 1 TSF BD

❖ **Follow up:** If diarrhea persists more than 2 week: Persistent diarrhea

- Syrup. Nitazoxanide 100mg/5ml () 1-3 years: 1 TSF BD & 4-11 years: 2 TSF BD-3 days
- Rehydration according hydration status
- Advice: Stool RE and C/S

Choice of antibiotic:

Shingella: Quinolone for 5 days e.g levofloxacin 10mg/kg/day-BD. e.g.

- Syrup. Levofloxacin 125mg/5ml 1ml for every 5kg stat and BD

EPEC, ETEC, EIPC: Azithromycin e.g.Susp. Azithromycin 200mg/5ml ()
1TSF for every 20kg OD- 5 days
E.histolytica: Metronidazole 30-40mg/kg/day TDS
Suspension. Metronidazole 200mg/5ml 1ml for every 3 kg stat and TDS
C.difficile: Metronodazole 30mg/kg/day TDS
Suspension. Metronidazole 200mg/5ml 1ml for every 4kg stat and TDS
Giardia: Metronidazole 7.5mg/kg/day TDS
Suspension. Metrondzaole 200mg/5ml 0.5ml for every 10kg stat and TDS
If perianal excoriation present: indicates lactose intolerance
Cream. (Clotrimozale 1% + Hydrocortisone 1%) Apply locally BD – 5 days

Acute Appendicitis

Chief complaint: Peak onset: 12-18 years of age

- Periumbilical shifted to RIF for 12 hours
- Vomiting several times, Fever for 6 hours

O/E:
Appearance: Ill looking, Temp: Raised
HRS: Tachycardia, BP, RR, Dehydration
Systemic examination:
Mc Burney's point tenderness: +
Tenderness in RIF: +
Investigation:

1) **CBC:** Neutrophilic leukocytosis
2) Plain X ray abdomen, urine R/E
3) USG: Abdome+pelvis (Appendix: ≥ 6mm wall thickness, luminal distension, mass

Rx Date: Time:
Bed rest
Diet: NPO TFO

- **Inf. Plabolyte-M IV**
- **Inj. Ceftriaxone 1gm+ 10ml DW**
  50-100mg/Kg/D]
- **Inj. Tramadol 100mg/2ml**
- **Inj. Ondasetron 4mg (Onset)**
  1 amp IV stat and TDS

Definitve tretament: Appendectomy

Paediatric appendicitis score:

Features	Score
Fever (>100°F)	1
Anorexia	1
Nausea, vomiting	1
Cough/percussion/ hopping tenderness	2
Right lower quadrant tenderness	2
Migrate of pain	1
Leucocytosis (10,000/mm^3)	1
Neutrophilia (>75/mm^3)	1

Score ≥8: High possibility
Score 3-7: Further evaluation necessary
Score ≤ 2: Low possibility

PEPTIC ULCER DISEASE (PUD)

Chief Complaint:

- Recurrent upper abdominal pain/poorly localized abdominal pain/nocturnal pain waking the child having relation with food and relived by taking antacid.
- Feeding difficulty, crying episode,
- hematemesis, melena

O/E: Vitals , Per abdomen:

- Epigastric tenderness: +
- No organomegaly

Investigation:

1. CBC with PBF
2. Iron profile
3. Esophagogastroduodenoscopy with biopsy

Rx Date: Time:

Triple therapy:

Syrup. Amoxicillin 125/5ml (Amoxil)
1TSF for every 5kg BD [50mg/kg/day BD -14 days]
Syrup. Clarithromycin 125/5ml (Claritek)
1TSF every 16kg [15mg/kg/day BD-14 days]
Tab. Rabeprazole 10mg (Rabiced)
< 15 kg: 5mg/day, >15 kg: 10mg/day ,> 12 year: 20mg/BD – 1 month

Or,

Syrup. Amoxicilin 125/5ml (Amoxil)
1TSF for every 5kg BD [50mg/kg/day BD-14 days]
½ TSF for every 10 kg [20mg/kg/day BD – 14 days]
PPI (Ezomol) 1mg/kg/day BD

Or,

Syrup. Clarithromycin 125/5ml (Claritek)
1TSF every 16kg [15mg/kg/day BD – 14 days]
PPI (Ezomol) 1mg/kg/day BD

Syrup. Sucralfate 1g/5ml
[40 – 80 mg/kg/day BD-14 days]

JUVENILE COLONIC POLYP

Chief complaint:

- Usually baby of 2-10 years,
- peak age 2 – 5 years
- Painless per rectal bleeding, drop by drop at the end of defecation

O/E: Vitals , Local examination

Rx Date: Time:

Refer to pediatric surgery unit for polypectomy

HAEMORRHOIDS

Chief complaint:

Peak onset: 12 18 years of age

- Per rectal bleeding
- Prolapsed, incarceration, thrombosis

O/E: Vitals , local examination

Refer to pediatric surgery unit: If not responding to medical MX.

Rx Date: Time:

- **Oinment. Anustat**
  Apply per rectally BD – 2 – 4 weeks.
- **Syrup. Lactulose 3.35mg/5ml**
  1 TSF 5kgs BD [0.5-1kg/day BD]

Sitz bath:

Take 1 bowl luke warm water + 3 TSF povicep + 3 TSF table salt, then get the anus in water for 10 – 15 minutes 2/3 times daily – 2-4 weeks

EPLIEPSY

A. **Generalized seizures:** (1) Absence; Typical, typical (2) Generalized tonic-Clonic (Tonic Clonic, Myoclonic, Atonic, Infantic spsm)
B. **Partial Seizure:** (1) Simple partial (conscious senses retain), Motor, Sensory, Autonomic, Psychic (2) Compete partial (consciousness imperial) (3) Partial Seizures with secondary generalization
C. **Unclassified Seizures**
D. **Syndromes** (i.e Rolandic epilepsy, Dravet Syndrome, Ohtah are syndrome etc)

Chief Complaint:

Convulsion for several time e.g
Tonic: Premonitoring symptoms e.g. not feeling well aura Convulsion followed by unconsciousness. Tongue bite, frothing bowel and bladder incontinence etc. may be present
Clonic: Rhythmic contractions
Myoclonic: Rapid shock like contracture, not rhythmic
Atonic: Student fall or head drop (Due to sudden loss of tone)
Absence seizure: 5-8 years old child with sudden loss with unresponsiveness, eye flutter for few seconds.
Simple focal seizure: Sensory or brief motor without loss of consciousness
Complex focal: Sensory or brief motor with loss of consciousness no fever
Past Hx: H/O PNA, meningitis, neonatal hypoglycemia
O/E: Vitals, Appearance, Systemic examination

Investigation:

1) **EEG:** After 2 weeks of seizure
2) **CT scan/ MRI of head**: To exclude mass lesion, developmental or congenital brain anomaly
3) **RBS**
4) **Serum calcium and magnesium:** Hypocalcemia and hypomagnesemia may cause convulsion
5) **CSF study:** If neck rigidity or other signs of meningeal irritation present

Rx : Date: time:

- Bed rest, Diet: NPO TFO
- O2 inhalation Stat & SOS
- **Inj. Ceftriaxone 500mg (Oxidil)**
  IV stat and OD [**DOSE**; 100mg/Kg/D]
- **Inj. Phenytoin (Epigran)** 2.5-5mg/kg in 100ml pladyx or NS IV continuous infusion

If active convulsion present:

Manage like status epilepticus

Choice of anti-epileptic drugs:

❖ **Generalized and focal seizure:**

Tab. Oxcarbazepine 150/300mg
20-40 mg/kg/day-BD **OR**
Tab. Carboamazpine 200mg
10-20 mg/kg/day-BD **OR**
Tab. Levetiracetam (lerace) 250mg /500mg
20-40 mg/kg/day (12 hourly/6 hourly) **OR**
Tab. Phenobarbitone 30mg/60mg 5-6 mg/kg/day

❖ **Absence seizure:**

Syrup. Ethosuximide 5mg /100ml
20-30 mg/kg/day-BD **OR**
Tab. Lemotrigine 25/50/200mg (0.15mg/kg OD for 2 weeks, followed OD for 2 weeks) and
Syp/Tab. Valprocacid (Epival) (15-40 mg/kg/day-BD) or
Tab. Gabapentine 30mg/600mg
30-60 mg/kg/day-BD

❖ **Myoclonic epilepsy:**

Lemotrigine + Valproic acid (Dose: see previous once)

Advice:

- Do not ride on the tree
- Don't swimming in deep water, river
- Follow driving rules regarding epilepsy strictly
- Don't walk in high way
- Avoid fire

Note: If active convulsion present then treat or status epilepticus

FEBRILE CONVULSION (Febrile fits)

Definition: Febrile seizures (convulsion) are seen in 2-4% children, and is seizure disorder associated with temp usually higher than 102F. common in 6months to 5year age, Peak age: 14-18 months of age Or seizures occurring in apreviously healthy child between the age of 6 month and 5 years with no evidence of central nervous system infection or other defined cause, upto 5% of children will have febrile seizures.

Chief Complaint:

- Fever (usually > 102°F)
- Convulsion <5 mins, not > 10 time; followed by normal level of consciousness, playful, eating well
- **Family Hx:** Family Hisotory of febrile seizures in approximately 10% of those affected
- Evidence of primary cause, viral infection otitis media may be present

O/E: Vital (Pulse, HR, RR, Temp)

- Appearance: Sleepy during convulsion
- Signs of meningeas irritation: Absent

Investigation:

1) CBC, RBS,
2) **Serum electrolyte:** Hypocalcemia and hypomagnesemia may cause convulsion
3) Serum calcium , Chest XR
4) **LP; CSF study: Indications are**

✓ Any doubt of meningitis / encephalitis
✓ First attack is < 12 months of age
✓ Age 12-18 months associated with complex seizure, alter sensorium
✓ If recovery is slow or under prolongation of post-ictal sleeps

5) EEG is normal in febrile convulsion should be done after 2 weeks interval
6) If abnormal neurological examination then CT or MRI brain

Advice:

❖ Parental concelling about nature of seizure and favorable prognosis should be clone
❖ Don't slap, shake or force anything in child mouth

Rx: **Date:** **time:**

- **Inj. Midazolam (Dormicum) 10mg** 0.15m/kg IV stat. can repeat dose if needed
- **In case of continuous fits**; give **Inj. Phenytoin (Epigran)** 2.5-5mg/kg in 100ml pladyx or NS IV continuous infusion or see topic status epilepticus
- **Inj. Ceftriaxone (Oxidil)** 100mg/kg IV OD (ATD)
- **Inj. Dexamethasone (Decadron)** 0.6mg/kg in BD
- **For fever: Cold Sponging and Inf. Paracetamol (provas) 1.5mg/kg ...give in TDS Or** Syrup Paracetamol 120mg (Panadol)

If Hypoglycemia:

- **Inf. 10% dextrose saline** 1ml/kg IV stat

If Hypokalemia:

- **Inj. KCL 1-2meq** in NS or dextrose saline IV slowly

If Hypocalcemia:

- **Inj. Calcium gluconate 10%** 10ml (1-2ml/kg IV BD)

If Hypomagnesemia:

- **Inj. Mgso4 1mg/kg IM** stat

On discharge:

1. **Syrup Cefexime 100mg/5ml (cefiget)** 8mg/kg/day BD for or 1 tsf OD for 5 days
2. **Syrup Paracetamol 125/5ml (Calpol, Panadol)** 1 TSF for every 8 kgs TDS- if fever present
3. **Syp Sodium Valproate 250mg/5ml (Epival) 1 tsf OD continue**

SUBTYPES

Simple Febrile Seizures	Complex Febrile Seizures
1 in 24 hours	More than 1 in 24 hours
Last <15 minutes	Last >15 minutes
Generalized seizures	Focal seizures
No residual neurological deficits	Focal deficit (Todd paralysis) remains

STATUS EPILEPTICUS

- SE is defined as continuous seizure activity or recurrent seizure activity without regaining consciousness lasting >5 mins.
- 4 sequential steps:

1. Maintenance of airway, breathing and circulation (ABC)
2. Control of convulsion

Inj. Midazolam (Dormicum) 0.15mg/kg) IV stat repeat dose if needed

⬇

If seizure continues

Inj. Phenobarbitone (Phenobarb) 20mg/kg IV over 10-15 minutes

⬇

If seizures persist or recur with

Inj. Phenobarbitone (Phenobarb) 10mg/kg IV over 10-15 minutes

(Maximum loading dose: 40mg/kg)

[If seizures settle: maintenance dose Phenobarb after 12 hours

Inj/Syrup Phenobarb 2.5-5mg/kg/dose IV/PO OD]

⬇

If seizures still continue after loading dose of Phenobarb then

Inj. Phenytoin (Epigran) loading dose; 20mg/kg IV OVER 20 minutes

IF seizures persist or recur; Phenytoin(Epigran) 10mg/kg IV over 20mins

[If seizures stop: then start Maintenance dose of phenytoin after 12 hours

Inj/syrup Phenytoin (Epigran) 2.5-5mg/kg/dose IV/PO BD PLUS

Inj/syrup Phenobarbitone (Phenobarb) 2.5-5mg/kg/dose IV/PO OD]

⬇

If Seizures still persist or recur after Phenytoin loading dose then;

Inj. Levetiracetam (Lerace) 10mg/kg IV over 15 minutes

[If seizures stop start maintenance dose as

Inj/Syp Lerace 10mg/kg/DOSE IV/PO plus Phenbarb & epigran as above]

⬇

If seizures till continue or recur then; give Pyridoxine 50-100mg Iv infusion

Slowly (Inj. Neurobion diluted in NS Iv Slowly) monitor ECG

[If seizure stop continue Pyridoxine 15-30mg/kg/day PO OD lifelong]

⬇

If Seizures till continue or recur: start Midazolam infusion 0.1-0.4mg/kg

Prepare the patient for mechanical ventilation

⬇

If seizures still continue:

***Give IV glucose, Sodabicarb, anti-oedema measure (e.g. corticosteroid & mannitol)**

Cough

Syp Acefyl [(Less than 2 years 1/2 tsf tds) (More than 2 years 1 tsf tds)]

Nasal blockage

Salinase nasal drops 2 drops tds

UTI in children

Chief complaint: Dysuria, Frequency, Loin pain, Vomiting/diarrhea, Poor feeding/failure to thrive, Fever

Diagnosis Distinguish between upper urinary tract symptoms (fever,vomiting,loin pain)and lower urinary tract symptoms(dysuria,frequency,abdominal pain) Ask about urinary stream in boys and family h/o vur

1) Urine R/E and Blood CP
2) Urine dipstick test

Treatment

Child is less than 3 months

- Inj cefradine 25mg/kg bd

Child is more than 3 months with upper urinary tract Symptoms

- Syp novidat(ciprofloxacin-125mg/5ml or 250mg/5ml [10mg/kg/dose] TDS 7-10 days
- Syp spasler-p 1TSF BD 7-10 days
- Citralka sachet OD 7-10 days
- Increase fluids intake

Child more than 3 months with lower urinary tract symptoms

- Syp novidat-125mg/5ml or 250mg/5ml [10mg/kg/dose] tds 5 days
- Syp spasler-p 5 days
- Less than 2 years 1/2 tsf bd and More than 2 years-1 tsf bd
- Citralka sachet 5 days 1+1+1
- Increase fluid intake

PICA

CLINCIAL FEATURES;

- **Abnormal desigre to eat sunstances** (i.e, **chalk or ashes**) not normally eaten

Investigation;

1) **CBC, ESR, Serum Ferritin**
2) **HB electrophoresis**
3) **Serum vitamin B12, serum folic acid**

Note;

Repeat CBC, Serum ferritin after one month

RX; TIME; DATE;

Start iron therapy IF Hb is low

- **Iron Polymaltose drop (Maltofer)** **3** drops once daily – 1 months
- **L-Methylfolate calcium Myfol (Myfol)** 2 drop OD **OR** **L-methylfolate +vit B12 (Thrito drops)** 2 drop OD for 1months
- **Multivitamin drops (vidynil drops)** 5 drops P/O once daily – 1 month or Syp Vidynl-L 1 TSF BD according to weight for 1 month
- **Formula milk (Enfargrow, meij big, pediasure)**
- **Sy Epitizer 2.5ml** BD for one month
- **Diatery advice**

PAEDIATRIC DRUG WITH DOSE AND TRADE NAMES

ANTIBITICS

DRUG	DOSAGE	FORM	Trade name (brand)
Amoxicillin	PO: 20 – 50mg/Kg/day IV: 50-100mg/kg TDS OR simply 50mg/kg/day	Inj: 250mg, 500mg **Oral** Cap: 250mg, 500mg Syp: 125mg/5ml Drop: 100mg/ml	Amclav, calamox Cap Amoxil 250/500mg Syp: Amoxil 125mg/5ml Amoxil drop 100mg/ml
Amoxicillin + Clavalinic acid	Neonate: 30mg/Kg/day BD Children: 20-45mg/Kg/day TDS 1y to 6yrs: 1tsf – TDS 6y to 12yrs: 2tsf - TDS	Inj: 600mg (500+100) Inj.1.2gm(1gm+200mg) **Oral** Tab: 375mg Syp: 156.25/5ml Syp: 625mg	Inj Augmentin Tab Augmentin Syp. Augmentin
Benzathine penicillin	Neonate: 50,000 units/Kg / once IM Children: 3lac-6lac unit once every 3 – 4 weeks Older children: 12 lac units IM once every 3 – 4 weeks	Inj 6 lac unit/12lac units (intramuscular)	Inj penidure LA
Macrolide			
Azithromycin	10mg/Kg on day 1, followed by 5mg/Kg – OD for 4days Or 10mg/Kg OD for 3days Note: in enteric fever dose is 20mg/Kg – OD for 7days	Tab: 250mg/500mg Syp: 200mg/5ml	Tab: Azitma/Azomax Syp: Azit or zetro or Azomax
Erythromycin	30-50mg/Kg/day PO TDS/ QID 15 to 20mg/Kg/day IV TDS/QID **Neonate:** 12.5mg/Kg/ PO – QID & for Rheumatic fever prophylaxis:500mg/day- BD	**Oral:** Drop: 200mg/5ml Syp: 200mg/5ml Tab: 250mg/500mg	Erythrocin
Clarithromycin	7.5 – 15mg/Kg/day IV, PO – BD	Inj: 500mg/vial **Oral** Syp: 125mg/5ml Tab: 250mg, 500mg	Syp: Klaricid 125mg/5ml Tab: Klaricid 250mg Tab Klaricid XL 500mg
CEPHALOSPORIN			
Cephalexin (first generation)	25 – 100mg/Kg/day – QID	**Oral**; Syp: 125mg/5ml Syp: 250mg/5ml	Syp ceporex or Keflex 125mg/5ml, 250mg/ml
Cephradrine	50 – 100mg/Kg/day – QID	Inj: 250mg/500mg **Oral**: Syp: 125mg/5ml Syp: 250mg/5ml	Syp/inj Velocef Cap. Velocef 250mg, 500mg
Cefuroxime (2^{nd} generation)	50 – 100mg/Kg/day IM, IV meningitis: 200 -250mg/Kg/day – TDS/QID Oral: 20 – 40mg/Kg – BD/ TDS	Inj: 750mg/1.5gm **Oral** Syp: 125mg/5ml Tab: 125mg, 250mg	Zinacef Syp: Zinacef 125mg/5ml Tab Zinacef 125mg, 250mg

DRUG	DOSAGE	FORM	Trade name (brand)
Cefaclor	20-40mg/Kg/day BD or TDS (Max 1gm/day)	Drop: 100mg/1ml Syp: 125mg/5ml Syp: 250mg/5ml	Ceclor, cavalor, Syp: Ceclor 125mg/5ml or 250mg/5ml
Cefotaxime (3rd generation)	<1yrs: 100 -150mg/Kg/day TDS Children: 100 – 200mg/Kg IV, IM TDS & In meningitis dose is 150 – 200mg/Kg/day – TDS	Inj: 250mg, 500mg	Claforan Inj Claforan 250mg/vial, 500mg/vial
Ceftriaxone	50 – 80mg/Kg – OD, BD 0-4 weeks: 30mg/Kg/day	Inj: 250mg, 500mg, 1gm/vial	Inj oxidil, Rocephin
Ceftazidime	100 – 150mg/Kg/day – TDS	Inj: 250mg, 500mg, 1gm	Fortum
Cefexime	8 – 16mg/Kg/day PO – BD In enter fever: 20mg/Kg/day – 8 – 10days	Syp: 100mg/5ml Syp DS: 200mg/5ml CaP/tab: 200mg, 400mg	Cefspan Syp:Cefspan 100mg/5ml Syp Cefspan DS 200mg /5ml and Tab Cefiget 200mg, 400mg
Cefodoxime	8mg/Kg/day – BD	Sus: 40mg, cap:100mg	Orelox, Abacus, Orebro
Cefepime	10mg/Kg/day – BD	Inj 500mg, 1gm/vial	
Lincosamides			
Clindamycin	**Neonates:** <7 days: 10-15mg/Kg/day TDS >7days: 15 -20mg/Kg/day TDS **Children:**20-40mg/Kg/day TDS	Inj: 150mg, 300mg **Oral** Syp: 75mg/5ml, 600mg, Cap : 150mg	Dalacin – C
Lincomycin	**Upto 1month:** not recommended • **> 1month:** 30-60mg/Kg/day TDS PO 10-20mg/Kg/day BD/TDS IV, IM	Inj: 600mg/2ml Cap: 500mg (oral)	Lincocin Inj Lincocin 600mg/2ml CaP Lincocin 500mg
OXAZOLIDINONE Antibiotic			
Linezolid	10mg/Kg/day – BD Child 12 to 18years: 600mg – BD	Inj:600mg/300ml (2mg/ml) Syp: 100mg/5ml, Tab: 600mg	Ecasil, Nezkil, Nezocin
Amino Glycoside (GANT)			
Gentamycin	5mg/Kg/day – BD Intrathecal/ intraventricular 1-2mg daily	Injectable 20mg/2ml 20mg/2ml	Inj Gentacyn Gentacyn
Amikacin	15mg/Kg/day – BD	Inj: 100mg, 250mg, 500mg	Amikin, Gracil
TETRACYCLINE			
Doxycycline	2 – 5mg/Kg/day – BD	Oral: 100mg	Cap Vibramycin 100mg
CO-TRIMOXAZOLE			
Trimethoprim (TMP) Sulfamethoxazole (SMZ)	Upto 2week age: Contraindicted UTI, Otitis media, Temp: 8 – 10mg/Kg/day SMZ: 40-50mg/Kg/day BD	Suspension: TMP 40mg SMZ: 200mg/5ml Tab: 480mg	Septran, Septran DS, Cotrizole Syp Ceptran

DRUG	DOSAGE	FORM	Trade name (brand)
GLYCOPEPTIDE			
Vancomycin	**Neonate:** 30mg/Kg/day BD **Children:** 40-6mg/Kg/day IV infusion – TDS	Inj 500mg (dissolved with 5cc D/W) Inj 1gm (dissolved with 10cc D/w) Dissolved with 20 – 30cc baby saline then IV@ 20 – 30 minidrops/min over 7hour	Vancocin Inj vancocin 500mg Inj vancocin 1gm
CARBAPENEM			
Meropenem	60mg/Kg/day – TDS, Double the dose in meningitis	Injection	Meronam
Imepenem	60 – 100 mg/Kg/day – TDS	Injection 500mg (dissolved with 10 cc D/W), Dissolved with 20 – 30 cc baby saline then IV@ 20 – 30md/min	Tienam Inj Tienam 500mg given over 30min
QUINOLONES			
Ciprofloxacin	Inj: 15mg/Kg/day-BD Oral: 20mg/Kg/day-BD	Inj: 200mg/100ml **Oral**: Syp 125mg/5ml Tab: 250mg, 500mg, 750mg	Ciproxin Syp Ciproxin 125mg, 250mg Tab Ciproxin, Novidat,
Ofloxacin	15-20mg/Kg/day -BD	Oral:Tab 200mg, 400mg	
Nalidixic acid	50 -55mg/Kg/day -QID	Syp: 250mg/5ml Tab: 500mg	Negram
Levofloxacin	10 – 20mg/Kg/day		Leflox
MISCELANEOUS			
Nitrofurantoin	**Upto1:** Contraindicated 5 – 7 mg/Kg/day – QID	Oral Tab: 50mg, 100mg	Furadanitin Macrodantin
Fosfomycin	100 – 200mg/Kg/day – TDS	Injectable: 1gm Oral: Cap 500mg	Inj Focin, cap Focin Sus. Focin 250mg/5ml
AMTI Fungal			
Amphotericin – B	0.5-1mg/Kg/day IV over 1hour in 5% DS 1st day: 0.5mg/Kg/day then next day: 1mg/Kg/day 14day	Inj: 50mg/vial (dilute with distill water) **Note;** use within 24hours don`t use after 24hours	Inj Fungizone 50mg/vial
Fluconazole	**Systemic infection:** 6 – 12mg/Kg/day **Thrush:** 1st day: 6mg/Kg then 3mg/Kg for 14 – 21 days	**Oral** Syp: 50mg/5ml Cap: 50mg, 150mg	Cap Diflucan Syp Flu Z 50mg/5ml
Anti – viral			
Ganciclovir	10mg/Kg/day CMR Rhinitis: 14 – 21 days BD followed by 5-6mg/Kg/day IV once daily	Inj 250mg, 500mg/vial	Cyctovene, Cymevene, Gantovir

DRUG	DOSAGE	FORM	Trade name (brand)
Acyclovir	**Neonate:** 30-45mg/Kg/day IV **Children:** 15mg/Kg/day IV TDS **Chicken pox:** 20mg/Kg PO QID daily for 5days **Overall:** oral:20mg/Kg Inj: 10mg/Kg	Inj 250mg (dissolve with 10-20cc baby saline then IV @ 10 -20 drops or over 1hour • Tab200mg, 400mg • Syp 200mg/5ml • Cream 50mg	Zovirax, cycloz Syp cycloz 200mg/5ml Tab cycloz 200mg, 400mg Cycloz eye ointment 3% Inj cycloz 250mg/ Viral Cycloz cream 10gm
Anti-amoebic			
Metronidazole	IIV; 15-30mg 1.5ml/Kg/ day **Oral:** 30-50mg/Kg/day TDS	Inf 500mg/100ml Syp: 200mg/5ml Tab: 200mg, 400mg	Flagyl, Metrozine, Inf. Flagyl 500mg/100ml Syp Flagyl 200mg/5ml Tab Flagyl 200mg, 400mg
Tinidazole	50 – 75mg/Kg/day – OD for 2 – 3 days	Tab: 300mg Tab: 500mg	Fasigyn, Tergynan,
ANTI-MALARIAL			
Chloroquine	**Malaria prophylaxis**: 5mg/Kg/week (once weekly) PO (Max 300mg/dose) **Therapeutic:** 10mg/Kg PO stat then 5mg/Kg after 6hour then 5mg/Kg – OD for 2days IV: 5-20mg/Kg/dose-BD until Clinical response is obtained then switch to oral.	Inj 250mg, 500mg Drop: 100mg/1ml Syp: 50mg/5ml Tab: 250mg 100mg of Chloroquine phosphate= 66mg of base)	Nivaquine, Syp Nivaquine 50mg/5ml Tab Nivaquine, Resochin 250mg
Primaquine	0.3mg/Kg – OD – 14days	Tab: 7.5mg, 15mg	Tab primaquine 7.5mg
Pyrimethamine + sulfadoxine	**Prophylaxis** 1/8 tab: 9-11months • ¼ tab: 1-3years • ½ tab: 4-8years • 9-14years: ¾ tab once a week or 1+1/2 tab once every 2week. **Therapeutic: < 4years**: ½ tab stat **4-8years:** 1 tab stat **2-14years:** 1+1/2 tab stat	Syp 25mg pyrimethamine 500mg Sulfadoxine Tab pyrimethamine 25mg Sulfadoxine 500mg	Fansidar, Ridmal, Malavis **Tab Fansidar** 500mg+25mg **Syp Fansidar** 500mg+25mg
Quinine	20mg/Kg loading dose over 4hours then 10mg/Kg over 2-4hour • 25mg/Kg/d TDS 3 to 7 days PO **Severe malaria:** 10mg/Kg/dose IV 8horly in 5% dextrose saline over 3-4 hour then 10mg/Kg/dose TDS orally For total 7days & Primaquine on Day8	Inj 300mg/5ml Tab 300mg	Inj Quinine, Q-phos 300mg Tab circonyl, Quinine 300mg
Artemether + Lumefantrine	5-15kg: 1tab, 16-25kg; 2tab 26-35kg: 3tab >30kg; 4tab At 0,8,24&48hour	Syp Artem plus Syp Areeva 80/480 Tab Areeva 40/240	Arceva, Artem

ANTI-ALLERGIC			
Chlorpheniramine	0.35mg/Kg/d Po – QID 6-12years – 2mg QID 2-6years – 1mg QID 1-2years – 1mg QID **OR** Upto 1year: 1mg/2.5ml (BD) 1-5years: 2mg/2.5ml-5ml(BD, TDS) >5 years: 2-4mg/5-10ml (TDS)	Syp 2mg/5ml Tab 4mg	Histamol, Allerphene Tab Histamol 4mg Syp Allerphene 2mg/5ml
Pheniramine malate	Upto 1years: 7.5mg (BD) 1-5 years: 7.5 – 15mg (BD, TDS) 5-12 years: 15mg – 22.5mg BD, TDS	Syp: 15mg/5ml Tab: 25mg, 50mg Inj: 22.7mg/ml	Avil, Coldene, Flueze Syp Avil 15mg/5ml Tab Avil 25mg, 50ml Inj Avil 22.7mg/ml
Loratidine	0.2-0.3mg/Kg OD,BD for Children >3years < 30Kg: 5mg/Kg/day > 30Kg: 10mg/Kg/day	Syp 5mg/5ml Tab 10mg	Clarix, Antial, Ambozial Syp antial, lorin-NSA 5mg/5ml Tab Antial, lorin-NSA 10mg
Desloratidine	**2-6years:** 1.25mg (half tsf) **6 – 12years:** 2.5mg (1 tsf)	Syp: 2.5mg/5ml, 0.5mg/5ml Tab 5mg	Desora, Alenor Syp desora 0.5mg/5ml Syp Alenor 2.5mg/5ml Tab desora 5mg
Cetirizine	0.2 – 0.3mg/Kg – OD or BD **2-5years:** 5mg PO OD or 2.5mg BD **>6years:** 10mg PO OD 5mg BD	Syp 5mg/5ml Tab 10mg Syp 1ml= 1mg	Rigix, zyrtec, cetriza Syp Zyrtec 5mg/5ml Tab Rigix, zyrtec 10mg
Triprolidine HCl		Syp 2mg/5ml	Syp Actidil 2mg/5ml Syp Actifed-P (in combination with paracetamol+pseudoephedrine
ANTI-EMETIC			
Dimenhydrinate	4 – 6mg/Kg/day – QID or 0.5 – 1.0mg/Kg/dose PO, IV, IM	Inj 50mg/1ml Syp 12.5mg/5ml Tab 50mg	Gravinate,
Metoclopramide	0.3mg/Kg/day – TDS or QID	Inj 25mg/2ml Syp: 5mg/5ml Tab 25mg, 50mg	Maxolon
Domperidone	0.1 – 0.2mg/Kg/dose – TDS	Syp 5mg/5ml Tab 10mg	Motilium
Ondansetron	• 0.15mg/Kg/dose IV – TDS • 6month – 1years – half tsf • >1years: 1tsf	Inj 2mg/ml, 4mg, 8mg, Syp 4mg/ml Tab 4mg, 8mg	Onset, Zofran, ondonix
NSAIDS			
Paracetamol (Acetaminophen)	10-15mg/Kg/dose QID (Max: 4mg/day) In case liver causes give lowest dose	Drops 30ml (upto 3 months) Syp: 120mg/5ml Syp: 160mg/5ml	Panadol, Calpol • Inf. Paracet 1gm/100ml Syp Panadol 120mg,160mg/5ml • Tab Panadol 500mg

DRUG	DOSAGE	FORM	Trade name (brand)
Ibuprofen	**Analgesic, Anti-pyretic dose** is 5 – 10mg/Kg/dose – TDS **JRA dose** is 30 – 50mg/Kg/d – QID	Syp 100mg/5ml Tab 200mg,400mg	Brufen, Actifen
Indomethacin	**PDA closure dose is:** Neonate 0.2mg/Kg to start then 0.1mg/Kg 2 doses (total doses 3) **Anti-inflammatory dose:** 1 – 3mg/day – TDS, QID	Cap 25mg	Indocin
Aspirin	• For fever dose is: 10 – 15mg/Kg/dose – QID (Max 3.6mg/day) • Anti-inflammatory dose 90 – 130mg/Kg – QID	Tab 75mg, 150mg, 300mg	Disprin, Ascard
Mefenamic Acid	• >6yrs: 8mg/Kg/dose QID • <8yrs: not advisable	Syp 50mg/5ml Tab 250mg, 500mg	SypPonstan 5mg/5ml Tab Ponstan 25mg Tab Ponstan forte 500mg
Diclofenac Na	**Upto 1yrs:** not recommended **>1yrs:** 1 – 3mg/Kg/day – BD, TDS	Inj 75mg/3ml Tab 20mg, 50mg	Voltran, Dicloran, Voren
Ketorolac	0.5mg/Kg/dose IV – TDS, QID	Inj 10mg/ml, 30mg/ml Tab 10mg	Toradol, TEKAC
Naproxen	5 – 7mg/Kg/dose – BD	Tab 250, 500mg	Neoprox. Synflex
PPI & H_2 blocker			
Omeprazole	0.5 – 1mg/Kg/dose – BD	Inj 40mg/ml Cap 20, 40mg Sachet 20mg, 40	Risek, Teph 20 Teph insta sachet
Pantoprazole	1mg/Kg/day – BD	Tab 20mg, 40mg	Protium, zopent,
Ranitidine	BD	Inj 50mg/2ml Syp 75mg/5ml Tab 150mg	Inj Zantac 50mg/2ml Syp Peptinil 75mg/5ml Tab Zantac 150mg
Famotidine	1-2mg/Kg/day (Max 40mg/day)	Tab 20mg, 40mg	Famot

Remaing drug with doses & trade name in Alphabetic order:

Drug	Dose	Form	Trade (brand) name
Albendazole	**>2yrs:** 400mg single dose before meal **<2yrs:** 200mg single dose after meal Hydatid cyst: 15mg/ Kg/ day-BD--28days repeated for 4 or more cycles with 15days drug free intervals	Syp 200mg/5ml Tab 200mg	Zentel, Zepar
Albumin 20%	0.5 – 1g/Kg/dose IV infusion (20gm in 100ml)	Inj 50ml, 100ml/bottle or vial	Human albumin
Ascorbic acid	• In scurvy: 25 – 500mg/day • In Thalassemia: 100mg daily	• Tablet 100mg, 500mg • Drops 100mg/ml	CECON
Amlodipine	0.2mg/Kg or 100 – 200mg/Kg once daily, increase at interval of 1 – 2 weeks upto 400mg/Kg (Max 10mg/day)	Tab 5mg, 10mg	Norvsac, Sofvasc

Drug	Dose	Form	Trade (brand) name
Captopril	0.1mg/Kg/dose – 8houlry	Tab 25mg, 50mg	Capril, Capoten
Cholesteramine	1gm/dose **or** 240mg/Kg/day	4gm Sachet	Brand not available
Combination of Spironolactone 50mg Furosemide 20mg **Or** Spironolactone 50mg Furosemide 40mg	3-5mg/Kg/day spironolactone 1-2mg/Kg/day Furosemide to be taken at morning	Tab 50mg/20mg, 50mg/40	• Spiromide • Spiromide – 40
Colistin	25000 IU/Kg/day–TDS	Inj. 4lac unit, 2lac unit dilute with 10ml D/W then give in 30ml IV fluid	Coliject
Cyclophosphamide	2-3mg/Kg/day- in nephrotic syndrome OD	Tab 50mg	Endoxon
Dobutamine	Children ; 2.5-40μg/Kg/min Neonate: 2-10μg/Kg/min	Inj to be given in drip IV Continuous	Inj: 50mg/ml
Dopamine	5 - 10μg/Kg/min in 500ml NS IV over 8 hour	Inj 40mg/ml Inj 200mg/5ml	
Dexamethasone	0.15mg/Kg/dose	Inj 4mg/ml, Tab 0.5mg	Decadron
Diazepam	Oral: 0.2 – 0.3mg/Kg/day IV: 0.3mg/Kg/day Per rectal: Neonate: 1.25 – 2.5mg child 1month – 2yrs: 5mg child 2 – 12yrs: 5 – 10mg child 12 – 18yrs: 10mg	Inj 5mg/1ml Tab 2, 5, 10mg	Valium
Enalapril	0.08mg/Kg/dose12-24hrly	Tab 5mg, 10	Renitec,
Folic acid	0.2mg/Kg/day – OD 1st day: 1tab then ¼th tab Anemia (Folic acid deficiency) <6 month: 25 – 35 μg/day 6m – 3yrs: 50 μg/day 4y – 6yrs: 75 μg/day 7y – 14yrs: 100 μg/day >15yrs: 200 μg/day	Tab 5mg	
Furosemide	1-2mg/Kg/day OD, BD (Max 4mg/Kg) **Or Oral:** 0.5 - 2mg/Kg -OD, BD	Inj 10mg/1ml Tab 20mg, 40mg	Lasix
FFP	10 – 20mg/Kg		
Ketotifen (Fumarate)	**Child:** 1tab (1 tsf) **Adult:** 1 – 2 tab (1 - 2 tsf)	Syp 1mg/5ml Tab 1mg	Asthotifen
Lactulose	1ml/Kg/day – BD, TDS	Syp 3.5gm/5ml Adult Syp: 66.7g/100ml	Kolac, duphalac
Losartan Potassium	2mg/Kg/day every day	Tab 25, 50, 100 mg	Cozaar, Eziday
Levothyroxin	**0-6month**: 8-10 μg/Kg/d **6-12month**: 6-8 μg/Kg/d **1y--12yrs:** 4 – 6 μg/Kg/d **>12yrs:** 2 - 3 μg/Kg/day	Tab 50 μg, 25 μg single morning dose on empty stomach	Thyronorm

Drug	Dose	Form	Trade (brand) name
MgSO4	0.1ml/Kg 1M OD in PEM	Inj 2.47gm/5ml **Or** Inj 10ml ampule each ml= 50mg	
Mannitol solution 20%	**As diuretic:** 0.25mg/Kg / dose in 15 min **or** 1 – 2g/Kg IV infusion over 2-6 hour **For cerebral edema:** IV infusion 30 min to 1 hour • Initial 0.5-1g/Kg/dose IV. • Maintenance: 0.25-0.5g/ Kg/dose every 4 -6hour	Inj: 20% – 500ml (20gm in 100ml or cc) In meningitis for – 2 – 3 days	
Midazolam	0.2 – 0.3mg/Kg	Inj 1mg/1ml Tab 7.5mg	Dormicum
Morphine	**Analgesia:** 0.05- 0.2mg/Kg/ dose every 2 – 4 hour **Continuous infusion**: 0.025 to 0.05mg/Kg/hour **Infant & Children:** 0.1 to 0.2mg/Kg/dose every 2- 4hour (IV, IM, SC)		
Nifidipine	0.25mg/Kg/dose 6-8hourly	Cap 10mg, Tab 20mg	Adalat
Prednisolone	1-2mg/Kg/day 6-12hourly	Tab 5mg	Rapicort,
Phenobarbitone	5mg/Kg/day – OD, BD **Anti-conversant:** Loading dose: 15-20mg/Kg/dose IV, PO if necessary repeat after 20mins up to max 40mg/Kg Maintaince dose: 3-8mg/Kg/day every 12hrs	Tab 30mg, 60mg Syp 20mg/5ml Inj 200mg	Debritone, Luminal, Gardenal
Phytomenadione (vit K)	**Prophylaxis:** 1mg single dose Treatment: 0.2mg/Kg/dose	Inj 2mg/0.2ml IM, oral	K – LOT
Phosphophenytoin	Loading dose: 20-30mg/Kg/ dose IV over 15min **Maintenance dose:** 15mg/ Kg/dose over 15 min then repeat same dose if needed		
Propranolol	0.8 – 1mg/Kg/day TDS **Thyrotoxicosis:** 2mg/Kg/day PO every 6hour with adjunct to anti-thyroid medication	• Inj 1mg/1ml • Tab 10mg, 20mg	Inderal

Drug	Dose	Form	Trade (brand) name
Salbutamol	0.2 – 0.4mg/Kg/dose TDS **Nebulization:** 0.15mg/Kg/dose every 20 – 30 mins for 3doses then 0.15 – 0.3mg/Kg every 30 mins to 4hour as needed	Syp 2mg/5ml 100μg/puff Neb. Solu: 1ml = 5mg Tab 2mg, 4mg	ventolin
Spironolactone	Neonate: 1-3mg/Kg/day BD Children: 3 mg/Kg/day	Tab 25mg, 50mg, 100mg	Aldactone
Theophylline	Infant & children dose: 10mg/Kg/day : 6month 6 mon-1yrs: 12mg/Kg/day 1yrs to 12yrs: 20 – 24mg/Kg/day – BD	Syp 30mg/5ml Tab 100mg, 300mg, 350mg	Syp siroline (in combination) Tab Theograd
Inj piperacillin Tazobactum	80mg/Kg/dose BD= 2cc/Kg/dose	Inj 4.5gm/100cc diluent	Tazop, Tanzo
Ursodioxycolic Acid	15 – 30mg/Kg/day – BD	CaP 250mg, 500mg Syp 250mg/5ml	Cap urso 250, 500mg
Zinc	2mg/Kg/day – OD, BD In case of Wilson, disease (Syp) <6yrs: 25mg BD 6 – 15yrs: 25mg TDS >15yrs: 50mg BD	Syp 10mg/5ml, 20mg/5ml	Zincat – OD
Zidovudine	Neonate: 80mg/Kg/day QID Children: 270-540mg/Kg/day TDS, QID	CaP 100mg	Zeedo

Anti TB drugs

Drug	Dose
Isoniazid (INH)	10 – 15mg/Kg
Rifampicin	10 – 20mg/Kg
Pyrazinamide	30 – 40mg/Kg
Ethambutol	15 – 20mg/Kg
Streptomycin	12 – 18mg/Kg
Pyridoxine	5 – 15mg/day

- Tab Myrin P forte 4HRZE for 2month
  After 2month
  Tab Myrin P 2HR for 4months

Weight in Kg	Number or ATZ tablet
30 – 37	2
38 – 54	3
55 – 70	4
>70	5

- **Liver tonic:**
  Syp Silymarin (Silliver) 1 TSF PO BD **or** **Syp Jetapar 1 tsf PO BD or**
  Syp HepaMerz 1 TSF PO BD **OR**
  Syp (Silymarin+vitamins) Hepatocam 1TSF PO BD

GYNEACOLOGY & OBSTERITICS

PELVIC INFLAMMATORY DISEASE (PID)

Definition: An ascending polymicrobial infection of the upper genital tract structures in females, involving any or all of the uterus, fallopian tubes, ovaries and may involve the neighboring pelvic organs.

Chief Complaint

- Lower abdominal pain
- Fever, per vaginal discharge

O/E: Vitals (pulse, BP, Temp) JACKLET

Per vaginal examination (PVE): there may be cervical motion tenderness, uterine tenderness & adnexal tenderness.

Investigation

1) CBC, RBS or FBS, Urine R/E
2) U/S Abdomen & pelvis
3) High Vaginal & Endocervical Swab

Indication for hospitalization

- ☐ Severe clinical symptoms (e.g., fever ≥38.5 °C [101°F], nausea, vomiting)
- ☐ Complicated PID with pelvic abscess
- ☐ Possible need for invasive diagnostic evaluation for alternate etiology (e.g., appendicitis or ovarian torsion) or surgical intervention for suspected ruptured tubo-ovarian abscess
- ☐ Inability to take oral medications
- ☐ Lack of response or tolerance for oral medications concern for non-adherence to therapy

Advice to the couple(Sexual activity):

Refrain from sexual activity until they have completed therapy

Rx Date: Time:

- **Cap Doxycycline 100mg (Vibramycin)**
  1+1 – 14 days [be erect for 30 mins]
- **Tab Metronidazole 400mg (Riam, Flagyl, Klint)**
  1+1+1 – 5days
- **Tab Pantoprazole 20mg (Zopent, Protium)**
  1+0+1 (before meal) 14days
- **Tab Drotaverine (Colofac135mg, Mebever)**
  1+1+1 (for Pain)
- **Tab Paracetamol 500mg (Panadol, Calpol)**
  1+1+1 (for fever)

Note: Doxycycline & Metronidazole should be used by husband too

If admitted in hospital:

- **Inj. Ceftriaxone 1mg (Oxidil, Cefxone)**
  1 vial IV – BD (ATD)
- **Cap Doxycycline 100mg (Vibramycin)**
  1+0+1 (or injectable – BD) 14 days
- **Inf. Metronidazole 100ml (Flagyl)** 1 Vial IV BD 14days

Alternatives:

- Cefoxitin (Inj Emidoxin)2gm IM Stat,
  Tab Probencid 500mg 2 tab stat plus
  Cap Doxycycline (100mg orally or IV BD)
- Cefotetan (2g IV every 12hours) plus doxycycline (100mg orally or IV BD)

VAGINAL CANDIDIASIS

Chief Complaint;

- Commonly referred to as "thrush"
- Per vaginal discharge
- Vaginal irritation, Foul smelling
- Dyspareunia (also may involve perianal skin)

Past Hx: DM, Immunosuppressive therapy, HIV

O/E: vitals (Pulse, BP, Temp) JACKLET

Per Vaginal examinations;

- ☐ Whitish or whitish grey cottage cheese – like, discharge
- ☐ Thick and profuse /scant secretion
- ☐ Foul smelling

Investigation;

The diagnosis usually made on inspection
Urine R/E, CBC, RBS

Rx Date: Time:

- **Cap Fluconazole 150mg (Fungone, Fungicare)**
  1 tab weekly for 6weeks
- **Tab Metronidazole 400mg (Riam, Flagyl)**
  1+1+1 – 5days
- **Tab Fexofenadine 120mg (Fexet)**
  0+0+1 – 10days (For itching)
- **Clotremazole (canesten, Gynosporine)** *vaginal cream*
  OR
  Hydrocortisone 1% + Clotremazole 1% cream (Hydrozole)

Advice Apply intravaginally every night 14days

Note: Husband should be treated with Nystatin ointment locally after each act of coitus – 7days

- Maintain personal hygiene
- Wash private part with Luke warm water

PREMENSTRUAL SYNDROME (PMS)

Definition: A women is consider to have PMS if she complains of recurrent psychological or somatic symptoms (or both) occurring specifically during the luteal phase of menstrual cycle

Chief complaint: Weight gain, body ache, feeling of bloating headache, breast tenderness, pedal edema, feet cramping

- Emotional instability, insomnia, loss of appetite, depression, mood swings, suicidal thoughts

Diagnosis: Made by excluding medical or psychiatric disorders

Advice: Counselling (behavior/cognitive therapy), Placebo therapy (50% response)
Daily charting of symptoms for 2months
Regular exercise, dietary modification

Rx Date: Time:

- **Tab pyridoxine 25mg (Vita-6)**
  1+1+1+1 – 14days (during luteal phase)
- Tab Mefanamic acid 500mg (ponstan forte)
  1+0+0 (if bloating, irritability, swelling, weight gain, or breast tenderness present)
- **Cap Fluoxetine 20mg (Depex)** 1+0+0 2weeks

If above Treatment fail: then

- **Tab Medroxyprogesterone 10mg (Provera)**
  1+1+1 – 3months with 7days intervals after every 21days

MENOPAUSE

The least menstrual period after minimum of one years amenorrhea, Average age: 51 years

Chief Complaint

- Hot flushes and night sweats
- Dryness of vagina & Vulvovaginal atrophy
- Insomnia, anxiety, irritability, memory loss, depression
- Joint pain (osteoporosis): occur lately

Investigation

1)Serum FSH and Serum estradiol, vit-D level

Rx Date: Time:

- **Tab calcium carbonate + Vit D_3 (Qalsium –D)** 0+1+0 – 3months **OR**
  Tab Cac1000 0+0+1 – 3months
- **HRCT:** if necessary

Follow up:
At 2 – 3 months then 6monthly
Yearly mammography PAP smear, USG pelvic, Serum estradiol

HIRSUTISM

Chief Complaint

- Hair growth in male pattern of distribution like chin, upper lip, chest, upper & lower back, abdomen, arm, thigh.
- Excessive facial or body hair

Investigation

1) FSH, LH, Testosterone: prolactin 3rd of menstruation
2) TSH, USG of Abdomen + pelvic

Rx Date: Time:

- **Tab spironolactone 50mg (Aldactone)**
  1+0+1 – 6months
- **For better management:** Refer to endocrinologist
- **Anti-androgen;** Cyproterone acetate, Finasteroid, Flutamide

Tab Finasteroid 1gm (Hairfin) 1 tab night 4month
Cosmetic treatment for hair; prevent depression

SECONDARY AMENORRHOEA

Absence of periods for 6months or more after previously regular menstruation

Chief Complaint

- Amenorrhea, vomiting, morning sickness and breast changes (for rule out pregnancy)

Hot flushes, night sweat (menopause)

Hx of: Medical disorder (Hypothyroid, Cushing)

- Stress, weight changes, exercise
- Surgery: pelvic surgery
- Drug Hx: if any

O/E Vitals (pulse, BP, Temp)

- Thyroid, abdominal examination
- PV examination: Virilization, Clitoromegaly

Investigation

1) **Urine Pregnancy test or Serum Beta HCG** (first line to rule out pregnancy)
2) **USG;** Abdomen + Pelvic
3) **Serum prolactin, CXR, CT brain**
4) **FSH, LH,** Testosterone: on 3rd day of menstruation

Rx Date: Time:

- **Tab Norethisterone 5mg (Primolut-N)**
  1+1+1 – 21days then stop for 7days Repeat cycle for 3months

If associate with weight gain + hirsutism: then

- **Tab Norethisterone 5mg (Primolut-N)**
  1 Tablet 8 Hourly– 7days
- **Tab Cyproterone acetate + Ethinylestradiol (Diane -35):** 1 Tablet daily for 21 days followed by one week break
- **Tab metformin 500mg (Glucophage)**
  1+0+1 – 1 month
- **Rimona sachet** 1+1 – 1month

DYSMENORRHOEA

Chief Complaint

- Severe & frequent menstrual cramps and pain during periods (Mostly first 3 days of menstruation)

Investigation

USG of Abdomen + pelvic

Rx Date: Time:

- **Tab Drotarorine 135mg (Colofac)**
  1+1+1 – 5days
- **Tab Mefanamic acid 500mg (ponstan forte)**
  1+1+1 – 5days

Advice: Drink plenty of water, hot compression to lower abdomen & maintain menstrual calendar

MENORRHAGIA

Chief Complaint

- Abnormally heavy or prolonged menstrual bleed.
- In pubertal age

O/E vitals (pulse, BP, Temp)

Abdominal +vaginal examination)

Investigation

1) CBC, BT, Serum TSH,

USG Abdomen + pelvic

Rx Date: Time:

- **Tab Mefanamic acid 500mg (ponstan forte)**
  1+1+1 – 5days
- **Cap Esomeprazole 20mg (Nexum, Ezomol)**
  1+0+1 – 4days
- **Cap Tranexamic acid 500mg (Transamin)**
  1+0+1 – 7days
- **Cap Iron + Folic acid (FefolVit, Bisleri)**
  1+0+0 – 3months

If needed: Then progesterone only drug

FIBROID UTERUS

Definition: Most commonest pelvic tumor (benign tumor) arising from smooth muscle (myometrium of uterus)
risk factors: early menarche, Late menopause, Nulliparity, OCP`s type 2 DM, hereditary.
Type; Sub-Mucous, Sub-Serous, intramural, cervical and Intraligamentary fibroid.

Chief Complaint

- 15 – 45years commonest age(30 – 45yr)
- Asymptomatic >50%, Symptom <50%
- Excessive per vaginal bleed
  - Menorrhagia inter-menstrual bleed
  - Post coital bleed
  - Heavy cyclical vaginal bleeding
  - Intermenstrual bleeding (Sub-mucosal fibroid or polyp)
- Pain in lower abdomen during menstruation
- Pelvic mass along with dragging sensation dull lower abdomen
- Increase urinary frequency, urgency (pressure Symptoms)
- Hemorrhoids, edema (pressure Symptoms)
- No red flag Symptoms like weight loss, Lymphadenopathy

O/E: Vital (pulse, BP, Temp) JACKLET, Anemia: +

- Lump in lower abdomen: 12/14 weeks size, firm, mobile side to side.
- No weight loss, no lymph adenopathy

PIVL: Bulky & Heavy uterus

Investigation

1) CBC, (look for anemia), RBS, TSH, CXR
2) USC, abdomen + pelvic
3) PAP smear, ECG, ECHO: if age >50years

Rx Date: Time:

If <7cm

- **Tab Ulipristal 5mg**
  0+0+1 – 3months
- **Tab Mefanamic acid 500mg (Ponstan forte)**
  1+1+1 – 5days
- **Cap esomeprazole 20mg (Nexum, Ezomol)**
  1+0+1 – 7days

Refer to gynecologist

- **If with infertility:** Myomectomy
- **If wish to have a child**: Mirena, hormone containing (IUCD): first line.
- **If completed family:** Total Abdominal hysterectomy

New techniques

Uterine artery embolization

❖ **Emergency Contraceptives**

Contraception within 72 hours of unprotected intercourse
Rx Levonorgestrel: Drug of choice
Tab Levonorgestrel 0.75mg/1.5mg (Tab Emkit – DS/ Tab ECP) Or
Tab Ulipristal acetate 30mg, 1tablet
Better than Levonorgestrel: as it effective up to 5days

POLY CYSTIC OVARIAN SYNDROME (PCOS)

Definition: Commonest endocrine disorder in women is characterized by insulin resistance oligo ovulation, hyperandrogenism, polycystic ovaries it runs in families and affects approximately 50% of first degree relatives

Chief Compliant

- Irregular menstruation
- Weight gain (obesity), infertility in married women

Diagnosis: require the presence of two of the following three criteria

1) Oligo – ovulation and/or anovulation (i.e., Oligomenorrhea, or amenorrhea)
2) Hyperandrogenism (C/F and/or biochemical elevation of testosterone)
3) Polycystic ovaries assessed by ultrasound

O/E: Vitals (pulse, BP, Temp) JACKLET

- Excess facial hair/HIRSUTISM, Obese

Investigation

1) RBS, TSH
2) FSH, LH and testosterone: on 3rd day of menstruation
   - ↑Androgens;(Testosterone, androstenedione)
   - ↑LH, FSH Ratio
3) Prolactin; Increased
4) USG Abdomen + pelvic

Rx Date: Time:

Anovulation Treatment:

- Weight reduction
- **Tab metformin 500mg (Glucophage)**
  1+0+1
- **Tab clomiphene citrate (cerophene, clomedon)**
  1 tab BD
- Inj. Recombinant FSH /
  Inj. Human gonadotropins
- Tab Letrozole 2.5mg : 1st line drug

Irregular cycles Treatment:

- Combined oral contraceptive pills (OCPS)
- Progesterone only pills

For 10days (from 14th day/midcycle)
For 5days (from 20th days)

HIRSUTISM Treatment:

- Anti-androgen, Cyproterone acetate, Finasteroid, Flutamide, spironolactone
- **Tab spironolactone 100mg (Aldactone)**
  1+0+0 [1st line]
- Cosmetic Treatment for hair: prevent depression
  Can advise multivitamins,

DRUGS SAFE IN PREGNANCY

Antibiotics:

Group	Generic name/ example	Trade name
Penicillin	• Amoxicillin	Cap Amoxil 500mg P/O TDS
Cephalosporin	• Ceftriaxone	Inj. Oxidil 1gm or 2gm
	• Cefixime	Cap Cefiget 400mg P/O OD or BD
	• Cephradine	Cap Velocef 250mg/500mg P/O - BD Cap Lewin 500mg P/O - BD
	• Cefuroxime	Tab Zinacef 250mg P/O – BD and Inj. Zinacef
Carbapenem	• Meropenem	Inj. Meronem or Meroget 500mg/ 1gm
Macrolides	• Azithromycin	Inj. Azitma or Zetro 250mg BD/ 500mg OD
	• Erythromycin	Tab Erythrocin 250mg, 500mg
	• Clarithromycin	Tab KLARICID XL 500mg OD OR Tab Rithmo 250mg – BD, 500mg - OD

Analgesic (Pain killer):

Generic Name	Trade Name
Paracetamol	Tab Panadol, Tab Calpol 500mg
Celecoxib (In RA)	Tab Celbex 100mg P/O BD, 200mg OD

Antihistamines (Anti-allergic):

Generic Name	Trade Name
Cetirizine	Tab ZYRTEC or Rigix 10mg
Levocetirizine	Tab T-Day 5mg
Loratadine	Tab Lorin-NSA 10mg or Antial 10mg
Fexofenadine	Tab Fexet 60mg, 120mg or Tab Fexo 60mg, 120mg

Antiemetic:

Generic Name	Trade Name
Dimenhydrinate	Tab Gravinate
Doxylamine + Pyridoxine	Tab Envepe / Tab Xyquil-DR
Meclizine	Tab Navidoxine
Cinnarizine	Tab Stugeron 25mg or Stugeron forte 75mg
Ondansetron	Inj. Onset 8mg / Tab Onset 8mg / Syp. Onseron 4mg/5ml

Anti-Spasmodic (Pain Abdomen):

Generic Name	Trade Name
Drotaverine HCL	Tab Nospa, Tab Relispa 40mg
Phloroglucinol	Syp Spaslar

Anti-diarrheal:

Generic Name	Trade Name
Azithromycin	Tab Azitma or Zetro 250mg BD, 500mg OD
Nitazoxanide	Tab Izate or Tab NT-TOX 500mg P/O BD

Fungal infection: Canesten cream (Clotremazole & cream)

Anti-ulcer:

Generic Name	Trade Name
Lansoprazole	Tab Selanz SR or Lanzit or QPro 30mg – OD
Famotidine	Tab Famot 40mg or Tab NOCID 20mg, 40mg
Ranitidine	Tab Zantac, OR Tab NUCLER 150mg P/O OD
Sucralfat	Syp Ulsanic
Omeprazole	Only Injection form (Teph-insta, 0mezol 40mg)

Anti-Constipation (laxatives)

Generic Name	Trade Name
Isphaghol husk	Isphaghol Husk
Lactulose	Syp Lilac Or Syp Duphalac
Milk of magnesia	
Glycerin suppository	

Anti-Hypertensive:

Generic Name	Trade Name
Nifedipine	Tab Adalat / Tab Nifedil 30mg
Methyldopa	Tab Aldomet 250mg
Labetalol	Inj. Labetalol 50mg/10ml, Tab Labetalol HCL 100mg

Anti-Asthmatics:

Generic Name	Trade Name
Short acting bronchodilator (salbutamol)	Inspirol HFA inhaler or Salbo HFA 100mg inhaler
Steroid inhaler Salmeterol + Fluticasone Propionate	Serotide Evohler 25/250mg Or Salmicort HFA inhaler 25/250mg Or Saltra inhaler 25/250mg

VItamins and Mineral

Generic Name	Trade Name
Iron & vitamins with folic acid	Cap FefolVit
Folic acid	Tab Folic Acid 5 mg
Iron + folic acid	Tab Bisleri Chewable Tablet

ANTENATAL VISIT

Duration of pregnancy:
On Examination:
- Vital (Pulse, BP, Temp)
- Anaemia, Jaundice, Oedema
- Weight, Height
- Thyroid and breast examination

Last menstrual Period (LMP):

Investigation:

Investigation at 1st Visit:
1) CBC, RBS, HBsAg, Urine R/E
2) Blood grouping and Rh Typing
3) VDRL, USG

In subsequent visits:
1. **Urine:** R/E, CBC, RBS
2. USG of Pregnancy profile

Advice: **At least 4 visits-**
1st: Within 16 weeks
2nd: Between 24-28 weeks
3rd: At 32 weeks 4th: At 36 weeks

Rx: **Date:** **Time:**

Before 12 weeks of Pregnancy:
Tab Folic acid 5mg 0+0+1- Continue

After 12 weeks of pregnancy:
Tab. Iron+ Folic acid (FefolVit)
- OD continue

Immunization (TT):
In 1st Pregnancy: 2 doses are required
1st Dose: Between 20-32 weeks
2nd Dose: 4 weeks after the 1st dose (2nd dose should be taken at least 4 weeks before EDD.
NB: If nay pregnant mothers have completed the 5 doses, she doesn't need any TT immunization. If she has taken 3 injections of TT in school or previous pregnancy (within 3 years) - She have to take only one injection.
Give TT in labour if she has not received it previously.

Premature Rupture of Membrane (PROM)

Chief Complaint:
- Watery vaginal discharge
- Fluid coming from cervix during cough
- **Ask for:** Pain, fever, foul, smelling discharge, fetal movement

Obstetric history

O/E: Vitals, Per vaginal/abdominal examination

Investigation:
1) CBC with CRP, urine R/E
2) USG of Pregnancy profile
3) Blood grouping and RH typing
4) Bleeding time, HVS

Initial Assessment:
1. Confirm the Dx of PROM
2. Assess the gestational age, position of fetus, liquor status, and estimated birth weight.
3. Exclude chorioamnionitis.

If concurrent infection then ;
inj Ampicillin (penbritin) 2gm IV QID
Inf Metronidazole (Flagyl) 100ml IV QID
Inj gentamycin (Delgenta) 3-5mg/kg IM OD

Rx: **Date:** **Time:**
- **Bed Rest:** in left lateral position
- **Use sterile vulval pad**
- **O_2 inhalation** (if fetal movement is reduced)
- **Inj. Ceftriaxone 1 gm (Oxidil, Rocephin)**
  1 vial IV stat and BD (ATD)
- **Inj. Dexamethasone 4mg/ml (Decadron)**
  [In 28-34 weeks of pregnancy]
  2 amp IM stat and 12 hour later. **[**Ideally betamethasone 2 dose or dexamethasone 4 doses**]**
- **Cap Iron+ Folic acid (FefolVit)** 1+0+0 2month

Active Management: IF
i) Term > 37 weeks ii) Chorioamnionitis
iii) Fetal distress iv) Fetal Death v) Fetal anomaly
❖ **NVD:** If vaginal delivery is feasible.
❖ **Caesarean section (CS): If**
Fetal distress, Chorioamnionitis develops
Failed induction, Unsatisfactory progress of labour,
Malpresentation, Previous C/S

PER VAGINAL BLEEDING IN EARLY PREGNANCY

D/Ds: 1. Miscarriage 2. Molar pregnancy 3. Ectopic pregnancy

Miscarriage: Types:

1) Threatened Miscarriage **(2)** Inevitable Miscarriage **(3)** Complete Miscarriage Incomplete Miscarriage **(5)** Missed Miscarriage

THREATENED MISCARRIAGE

Chief Complaint

- Pregnancy duration/ Amenorrhea
- Light per vaginal bleeding
- Dull pain in lower abdomen
- No H/O expulsion of products of conception

Investigation:

1) USG of pelvic organ
2) CBC, Blood grouping and Rh typing
3) RBS, TSH

Rx: Date: Time:

Inj. Prolution Depot 500mg/ HPC
(Hydroxyprogesterone Caproate) 250gm/ml
1 amp IM stat & 3 days interval up to 12 weeks (maturation of placenta) to 17 weeks
Tab Dydrogesterone 10mg (Duphaston) BD 2 weeks
Local vaginal use of Cyclogest 200mg
Advice on Discharge: Reassurance, Bed rest, Avoid contraception, Coitus abstinence for at least 2 weeks, Follow up visit in 4 weeks

INCOMPLETE MISCARRIAGE

Chief complaint:

- Pregnancy for...
- Heavy per vaginal bleeding/ irregular bleeding
- Cramping lower abdominal pain
- Partial expulsion fleshy mass per vagina

Past History: If present
Drug History: If present

Investigation:

1) USG of pelvic organ
2) HB %
3) Blood grouping and Rh typing
RBS and TSH

Rx: Date: Time

(If presented with shock, manage the shock first)
Specific:
Tab. Misoprostol 200 mcg (Cytotec, Breeky)
3 tab 3 hourly 3 doses.
If large POC or previous CS then do ICC
Rx on discharge:
Tab Ciprofloxacin 500mg (Cipval, Novidat) BD 7days
Tab. Metronidazole 400 mg (Flagyl, Riam)
1+1+1 total 5 days
Tab. Misoprostol 200 mcg (Cytotec, Breeky)
1+1+1 total 5 days
Cap. Omeprazole 40 mg (Zolbi, Risek)
1+0+0 30 min before meal- 14 days

COMPLETE MISCARRIAGE

Chief Complaint:

- Amenorrhea duration
- H/O expulsion of fleshy mass per vagina
- Light per vaginal bleeding
- Dull pain in lower abdomen

Investigation:

1) USG of pelvic organ
2) CBC , Blood grouping, Rh typing

Rx: Date: Time:

Tab Ciprofloxacin 500 mg (Cipval, Novidat)
1+0+1 7 days
Tab. Metronidazole 400 mg (Flagyl, Riam)
1+1+1 total 5 days
Cap. Omeprazole 40 mg (Zolbi, Risek)
1+0+0 30 min before meal- 15 days
Cap Iron +Folic acid (FefolVit) 1+0+0- 3 months

MISSED MISCARRIAGE

Chief Complaint:
- Amenorrhea from
- Mild/Irregular bleeding/brownish discharge
- No pain, no fetal movement

Past History: If present
Treatment: If present
On examination: Vitals
Fetal Movement: (-)
Fetal Heart rate: (-)
Investigation:
1) USG of pregnancy profile
2) CBC, Blood grouping and RH tying

Counselling:
Keep one unit of fresh blood ready

Rx: **Date:** **Time:**
Specific management:
Tab. Misoprostol 200 mcg (Cytotec, Breeky
3 tab 12 hourly 3 doses
If failed: Do ICC
Rx on discharge:
Tab. Ciprofloxacin 500mg (Cipval, Novidat)
1+0+1 – 7days
Tab. Metronidazole 400 mg (Flagyl) BD 5 days
Tab. Misoprostol 200 mcg (Cytotec, Breeky)
1+1+1- 14 days
Cap. Omeprazole 200 mcg (Zolbi, Teph-insta)
1+0+1 30 min before meal-15 days
Cap. Iron, folic acid (FefolVit) 1+0+1- 3 months

SEPTIC MISCARRIAGE

Chief Complaint:
- Reduced level of consciousness
- Amenorrhea duration
- H/O induced Miscarriage……days back
- Vaginal bleeding or foul discharge
- Abdominal pain, Fever

Treatment History: If present
Obstetric History, Menstrual history
O/E: Vitals, JACKLET, examine PV, abdomen
Investigation:
1) CBC, CRP, Blood grouping and RH typing
2) Urine R/E, USG whole abdomen+ pelvic
3) HVS

Monitor: **Vitals**, Urine output, Electrolyte
Rx on discharge: Antibiotics should be continued /changed according to CS report **PLUS**
Tab. Metronidazole 400 mg (Flagyl) TDS 5 days
Tab. Misoprostol 200 mcg (Cytotec, Breeky
1+1+1- 14 days
Cap. Omeprazole 20 mg (Zolbi, Teph-Insta)
1+0+1- 30 min before meal-15 days

Rx: **Date:** **Time:**
Diet: NPO, **Pass Catheter**
If the patient is in shock, manage the shock first
Open IV channel by two wide bore cannula
Inf. NS IV running stat
Inf. Plasmosol/plasmex (500ml)
IV @30 drops/min
Inj. Ceftriaxone 1gm (Oxidil) IV BD (ATD)
Inf. Metronidazole 100 ml (Flagyl) IV stat & TDS
Inj. Nalbuphine 30 mg/2ml (Nalbin)
1 amp IM stat & TDS and SOS
Inj. Drotaverine HCL (No-spa) IV stat and SOS
Inj. Omeprazole 40mg (Risek, Teph-insta)
1 vial IV stat & BD
Inj. Ondansetron 8mg (Onset) IV stat & TDS, SOS
Specific management:
Search and eliminate source of sepsis
1. Uterine curettage: If patient's condition is stable after giving antibiotics
2. Laparotomy: If any suspected injury to gut and uterus

ECTOPIC PREGNANCY

Chief Complaint: Amenorrhea (early weeks), Severe abdominal pain, Fainting, Light per vaginal bleeding
RX; **Definitive management: Laparotomy 1. Extensive damage to tube:** Salpingectomy
2. Little tubal damage: Repair salpingostomy

UTI IN PREGNANCY

Chief Complaint:
- Duration of pregnancy
- Burning micturition (Dysuria), fever
- Lower abdomen pain

Past History: If any
Treatment History: If any
Obstetric History, Menstrual history:
On examination: Vitals, JACKLET
Investigation:
1) CBC, USG of pregnancy profile
2) Urine R/E, Urine for culture:
Mid-stream urine sample

Rx: Date: Time:
- Drink plenty of water, Maintain personal hygiene
- **Tab Cefixime (Cefiget) 200mg** 1+0+1 for 5 days OR
  Tab. Nitrofurantoin 100mg ()1+0+1--- 7 days
- **Tab. Paracetamol 500mg (Panadol)** 1+1+1
- **Tab. Famotidine 40mg (Famoit)** 1+0+0 before breakfast
- **Cran max sachet BD**

Alternate Antibiotics
- **Tab. Azithromycin 500mg (Azitma)** P/O OD 6 days
  OR

Fofomycin (Focin sachet) 3gm on sachet PO Stat (single dose)

DIARRHOEA IN PREGNANCY

Chief Complaint:
- Amenorrhea (gestational age)
- Frequent passage of loose stool

On examination: Vitals, JACKLET
Investigation:
Serum electrolyte, CBC, RFTs

Rx: Date: Time:
- **Take ORS after each purging**
- **Tab. Azithromycin 500mg (Azitma, Zygrel)** 1+0+0

In severe case:
Inj. Ceftriaxone 1gm IV BD, Inf. NS or R/L IV

NAUSEA and VOMITING IN PREGANANCY (Mild):
- **Tab Doxylamine + Pyridoxine (Envepe, Xyquil DR)** 0+0+2 (2 tab at bed time) **OR**
  Tab Meclizine + Pyridoxine (Navidoxine) 0+0+1 (1 tab at bed time)

HYPEREMESIS GRAVIDUM

Chief Complaint:
- Amenorrhea (gestational age)
- Persistence , severe vomiting in pregnancy
- Weight loss, dehydration

On examination: Vitals, JACKLET
Investigation:
1) CBC (HB %), RBS, LFTs
2) USG of pregnancy profile
Serum electrolyte, RBS

Rx: Date: Time:
- **Diet:** NPO (no per oral) until improved
- **Inj. Omeprazole 40mg (Ruling)** 1 vial IV stat & OD
- **Inj. Promethazine (Phenergan)** 25 mg IV TDS **OR**
- **Inj. Ondansetron 8mg (Onset)** 1 amp IV stat & TDS **OR**
- **Inj. Metoclopramide (Metomide)** 5-10mg IV TDS

Rx of Discharge/Home Treatment:
- **Syp. Promethazine (Phenergan)** 25 mg PO TDS **or**
- **Tab Ondansetron 8mg (Onset) 1+1+1**

TYPHOID FEVER IN PREGNANCY

- **Cap Amoxicillin (Amoxil, Ospamox)** 1gm 1+1+1 for 14 days
- **Severe case or severe infection go for injectable with**
  Inj. Ceftriaxone (Oxidil, Rocephin) 2gm IV BD (ATD) 10-14 DAYS
  Tab Paracetamol (Panadol, Calpol) 500mg (for fever and pain)

PANCREATITS IN PREGNANCY

- **Inj. Ketorolac 30mg (Toradol)** IV stat and BD
- **Inj. Omeprazole 40mg (Risek, Ruling)** IV stat and OD
- **Inj. Cefuroxime (Zinacef)** 1.5g IV TDS (ATD)
- **Inj. R/L** 1L IV TDS and **Inj. Vit B1,B6,B12 (Neurobion)** IV OD

ANAEMIA IN PREGNANCY

Definition: Hemoglobin level <11g/dl in 1st & 3rd trimester, and <10.5 in 2nd trimester

Chief Complaint:
- Amenorrhea (gestational age)
- Lassitude & a feeling of exhaustion or weakness,

Past History: If any

On examination: Vitals, JACKLE
- Anaemia, Tachycardia
- Pallor of conjunctiva, mucous membrane, palm

Investigations:
3) CBC
4) USG of pregnancy profile
5) Special smear

Rx: Date: Time:

If HB < 6gm/dl: Blood transfusion

If HB 6 to 8 mg/dl:
- **Inj. Iron sucrose 100mg/5ml (Venofer)** 2mpule+ **Inf. 100 ml NS** IV @ 10 drops/min stat & after 1 week

If HB > 8 gm/dl:
- **Tab Ferrous sulphate + folic acid 200mg/400mcg 1+1+1** until Hb become normal then shift to **Tab Ferrous Fumarate + folic acid 185mg/400mcg 1 to 2 tab daily**

Tab Vit C (Cecon) 500mg 1 tab chewable 1 month

RH(-ve) Mother:

✔**After delivery:** NVD or CS, If the baby is Rh positive: Add **Inj. RhoGAM 300mg (Rhophylac) 1amp deep IM in deltoid within 72 hours of delivery** (Must be given to mother, not baby)

If baby is Rh negative : No anti-D is needed

ANTI-HYPERTENSIVE IN PREGNANCY

- **Tab Methyldopa (Aldomet) 1 tab per oral BD OR**
- **Tab Labetalol 100mg, 200mg 1 tab per oral OD OR**
- **Tab Hydralazine 25mg 1 tab per oral BD**
- **Injectable; inj labetalol, inj hydralazine**

PRE – ECLAMPSIA (Gestational HTN)

Definition: It is defined as new onset hypertension (BP> 140/90mmHg), proteinuria (> 300mg/24hour) and pathological edema during gestation. Typically developing after 20 weeks of gestation in previously normotensive women.

Chief complaint:

- Persistence headache not responding to acetaminophen, Visual changes, SOB
- Right upper quadrant/epigastric pain
- Decrease fetal movement, lab our pain
- Abdominal pain and vaginal bleeding
- Headache, blurred vision in pregnant women or women who recently deliver

O/E: Vitals, BP: > 140/90, patellar reflexes

Investigation:

1) CBC, Blood group & Cross match
2) Serum tea S. creatinine, S. electrolyte
3) LFTs (SGPT, SGOT), serum bilirubin
4) 24hour urinary protein

Categorization

- ☐ **Gestational HTN;** BP > 140/90 mmHg without proteinuria
- ☐ **Non-severe Pre Eclampsia**: BP ≥ 140/90 mmHg but <160/100 (previous mild and moderate Pre Eclampsia with proteinuria)
- ☐ **Severe Pre Eclampsia;** BP ≥ 60/110, Multi organ involvement

Note: NICE guidelines say women who are at high risk of developing pre-eclampsia should take Aspirin 75mg OD from 12 weeks until birth of baby

Rx: **Date:** **Time:**

Monitor: vitals, urine output, RR & patellar reflex every 30minutes

- **If severe Hypertension**
  Inj. Labetalol 50mg/10ml 20mg (4ml) IV over 2min
  If needed Repeat 4-8ml in 100ml pladex (Up to maximum IV 300mg) **OR**
  Inj. Hydralazine 20mg IV at 20min intervals
- **Tab labetalol 100mg** 2+2+2
- **Tab methyldopa (Aldomet)** 250mg 1+1+1
- Cap Omeprazole 40mg (Zolbi) 1+0+0

If BP still not control then

Tab Nifedipine Immediate release (Adalat)
10-20mg P/O repeated in 30min as needed then 10mg 1+1+1+1 (Max 180mg/day)

If preeclampsia associated with pulmonary edema

- **Inj. Nitroglycerine (Nitronal)**
  5mcg/min IV slowly increased every 3 – 5 mins

For prevention of seizures

- **Inj Mg-sulphate 50g/10ml** (1ml= 500mg)
  Loading dose: 4-6mg (8ml) + 12ml Dextrose saline or 100ml NS IV state over 10 – 15 mins
  Then 2gm/hour infusion

❖ **Criteria for Diagnosis of Pre-eclampsia**

- SBP ≥ 140mm Hg or DBP ≥ 90mmHg on at least 2occasion at least 4hours apart after 20weeks of gestation in previously normotensive patient and new onset of 1 or > of the following.
  1) Proteinuria ≥ 0.3g in a 24hour urine or protein/Creatinine ratio ≥ 0.3 (mg/mg) (30mg/mmol) in a random urine specimen or dipstick ≥ 2 + if a quantitative measurement is unavailable.
  2) Platelet count < 100K
  3) Visual symptom (blurred vision, flashing lights or spark, scotoma)
  4) Serum Creatinine > 1.1mg/dL (97.2micromol/L) or doubling of the Creatinine concentration for the local lab
  5) Pulmonary edema
  6) New onset & persistent headache not accounted by alternate diagnosis & not responding to analgesics

Patients who are at high risk to develop pre-eclmapsia;

Hypertension in previous pregnancy, Chonic kidney disease, dibatese, SLE, Anti-phospholipid syndrome or previous history of pre-eclmapsia

Remember to avoid;

- Diuretics only in setting of pulmonary edema prior to delivery
- Avoid Angiotensin converting enzyme inhibitors ACEi, Angiotensin II receptor blockers ARBS, and direct renin inhibitors Aliskiren as they are associated with significants fetal real abnormlaties

HELLP SYNDROME

Definition: A syndrome in pregnant and postpartum woman characterized by haemolysis with microangiopathic blood smear, elevated liver enzymes and low platelet count .it represent severe form of preeclampsia HELLP (Haemolysis, elevated liver enzymes low platelets).

Chief complaint:

Symptoms typically develop b/w 28 and 37th week of gestation, but onset in the late 2nd trimester or at term postpartum is also common.

- Nausea, vomiting, right upper quadrant pain.
- Epigastric pain
- Visual changes (e.g., blurred vision, flashing lights or sparks)
- Headache, Hypertension, jaundice, Proteinuria
- Past Hx: previous history of preeclampsia or HELLP is a risk factor for HELLP syndrome

O/E: Vitals, Hypertension, jaundice

Investigation:

1) CBC, Peripheral smear
2) LFTs, Bilirubin (direct, indirect & Total)
3) Serum LDH, Serum Creatinine

if continuing hemolysis, persistence Thrombocytopenia and Hypoproteinemia:

Postpartum erythrocyte and thrombocyte substitution & albumin supplementation

Postpartum plasma exchange; FFPs

Rx: Date: Time:

- **Inj. Mg-sulphate 50gm/10ml** (1ml=500mg) (loading dose) is 8 ml Mgso4 + 12ml dextrose saline) or 100ml NS IV stat over 10-15 mins
  Maintenance dose: no need
- **If hypertension is present**
  Inj. Labetalol 50mg/10ml
  20mg (4ml) IV Over 2 min
  Repeat 4ml to 8ml in 100ml pladex if BP still high after 15 mins
- Platelet transfusion for thrombocytopenia
- If platelet less than 50k then
  Inj. Dexamethasone (Decadron) 6mg
  IV BD

Immediate delivery is the Treatment of choice if ≥ 34 weeks gestation (after BP control)
Vaginal delivery is preferred if ≥ 30 weeks gestation if there is no obstetric contraindication
If both mother & fetus are stable cesarean section should be considered for < 30 weeks gestation.

Lab criteria for diagnosis (Tennessee classification)

1) Haemolysis, established by at least two of the following
   - Peripheral smear with schistocytes and burr cells.
   - Serum bilirubin ≥ 1.2 mg/dl (20.52 micromol/L)
   - Low serum Haptoglobin (≤ 25mg/dl) or lactate dehydrogenase (LDH) ≥ 2 times the upper level of normal (based on laboratory-specific reference ranges)
   - Severe anemia, unrelated to blood loss.
2) Elevated liver enzymes; Aspartate aminotransferase (AST) or ALT ≥2 time the upper level of normal (based on lab specific ranges)
3) Low platelet: < 100,000 cells/microL

ECLAMPSIA

Definition: It is the development of new onset seizures, superimposed upon pre-eclampsia, in a women b/w 20 weeks of gestation and 4 weeks postpartum (Preeclampsia with seizures)

Chief complaint:

- Pregnant women at >20 week of gestation or <4 weeks postpartum with seizures, coma, or encephalopathy
- Occasionally eclampsia can present with seizures in absence of elevated BP and Proteinuria
- Past history if any

O/E: Vitals, BP: > 140/90, patellar reflexes

Investigation:

5) CBC, Blood group & Cross match
6) Serum urea, creatinine, electrolyte
7) LFTs (SGPT, SG0T), serum bilirubin
8) Urine free protein, coagulation profile

Monitor: vitals, urine output, RR & patellar reflex every 30minutes

MgSo4 toxicity:

- ☐ RR: <16/min
- ☐ Urine output: <30ml/hour
- ☐ Absent patellar reflex
- ☐ Hypothermia, hypotension, flaccid paralysis

For maintenance dose of MgSo4: check

- ☐ Urine output > 30ml/ hour
- ☐ Respiratory rate (RR) >16/min
- ☐ Patellar reflex present

Antidote for MgSo4 toxicity:

Inj. Calcium gluconate 10% 15-30 ml in 100ml pladex IV over 10 minutes

BP TARGET;

Generally <160/110 mmHg
Non-severe HTN, no co-rmobs= 130-155/80-105
Severe HTN, WITH co-rmobs= <140/90 mmHg

Rx: **Date:** **Time:**

- Maintain airway, breathing , circulation
- **Bed rest,** left lateral position pass catheter
- **Diet;** NPO no per oral)
- **O2 Inhalation stat and SOS**
- **Pass double IV line**
- **Inf. NS IV** @ 30drops/min
- **Inj. Ceftriaxone 2gm (Oxidil, Rocephin)** 1 vial IV stat and BD
- **Inf. Metronidazole 500mg/100ml** (Flagyl) IV stat and TDS (if Postpartum)
- **Inj. Pantoprazole 40mg (Zentro, Zopent)** 1 vial IV Stat and OD
- **Inj. Furosemide 40mg (Lasix)** IV stat & SOS
- **Inj. Labetalol 50mg/10ml** 20mg (4ml) IV over 2 min If needed Repeat 4-8 ml in 100ml pladex
- **Inj. Dexamethasone 4mg (Decadron)** 8mg IV stat and after 12 hours

For control of seizures:
IV/IM Protocoal

- **Inj Mg-sulphate 50g/10ml (1ml = 500mg)** Loading dose; 8ml (4gm) + 12ml Dextrose saline or 100ml NS IV stat over 15 minutes **then** 10ml (5gm) IM (5ml in each buttock) **then** 5ml (2.5gm) IM every 4 hours on alternate buttocks

IV Protocoal;

- **Inj. Mg-sulphate 50g/10ml (1ml = 500mg)** Loading dose; 8ml (4gm) + 12ml Dextrose saline or 100ml NS IV stat over 15 minutes
  Maintenance dose: 1gm/hour for 24 hours
  Continue 24 hours after postpartum

If Mg-sulphate not available or contraindicated:

- **Inj. Diazepam 10mg/2ml (Valium)** Loading dose: 1 amp IV stat If convulsion recurs repeat
  Maintenance dose: 4 amp + 500ml NS IV (adjust the rate of infusion o that patient remains sedated But arousable. Don't use > 100mg/24hours

ABOUT DELIVERY IN PRE-ECLMAPSIA, ECLMAPSIA AND HELLP SYNDROME

STEP1 ; **Treat** severe pre-eclampsia (admit in labour room, maternal and fetal ssisment , treat HTN)

STEP2; **If contraindication to conservative management;**

- Persisitance symptoms or severe Hypertension
- Eclampsia, pulmonary edema, HELLP Syndrome
- Significant renal dysfunction, coagulapthy
- Abruption and previable fetus, fetal Compromised

If its present then go for DELIVERY
If it Absent then go to observation/step 3

STEP 3; **Intial observation 24-48 hour observation;**

- **Corticiodsteriod for lung maturation**
  - **Inj Betamethasone** (Betnesol) 12mg IM OD for 2 days or
  - **Inj Dexamethasone** (Decadron) 6mg IM BD for 2 days
- **Vitals moniritng and daily labs evaluation for HELLP syndrome**

If develop any contraindication into above then go for Delivery
If no contraindication develop then move ongoing management/step4

STEP4; **Onging in patient management;**

- **Daily maternal assisment**
- **Serials lab evaluation of renal function and for HELLP syndrome**
- **Daily fetal assisment and evaluation of**
- **Serial growth and amniotic fluid volume**

If develop contraindication then go for Delivery
If not then DELIVER AT 34 WEEKS OF GESTATION

Mode of delivery;

- **Immediate delivery** is the Treatment of choice if ≥ 34 weeks gestation (after BP control)
  Vaginal delivery is preferred if ≥ 30 weeks gestation if there is no obstetric contraindication
  If both mother & fetus are stable cesarean section should be considered for < 30 weeks gestation.
- Vaginal delivery is preffered in eclampsia and
  C-Section is used for usual obstetric indicaitons

DRUG TO BE AVOID IN BREAST FEEDING

Drug	Side Effects
Ciprofloxacin	Risk of arthropathies (theoretical)
Cimetidine (Antiulcer)	May accumulate in milk due to active transport
Aspirin (Analgesic)	Possible associated with Reye`s Syndrome
Tetracycline (Doxycycline)	Risk of dental staining & adverse effect on bone development
Co-trimoxazole	If infants with ↑ Bilirubin & G6PD deficiency
Amiodarone	May suppress thyroid
Diazepam	Accumulation if used for prolong time
Iodine	Can cause low thyroid hormone levels & goitre
Chloramphenicol	Can cause diarrhea, Bone marrow Suppression & gray baby Syndrome
Ethinylestradiol	May suppress lactation

INADEQUATE SECRETION OF BREAST MILK

Chief Complaint:
- Less than 6times breast milk secretion

Note: Adequate breast milk secretion ≥ 6 times

Rx Date: Time:
- **Tab Domperidone 10mg (Motillium, Peloton-v)** 1+1+1
  If not improved: Increase the dose to 2+2+2

If still not improved Then:
Cap Hi-Lacta 1+0+0

SUPPRESSTION OF MILK IF NECESSARY e.g. Baby is dead

Rx Date: Time:
- **Tab Bromocriptine 2.5mg (Brotin, Bromicon)** ½ +0+ ½ - 2 days Then 1+0+1 – 10 days **Or**

Tab Cabergoline 0.5mg (No brand available) Once weekly – 2weeks

MASTITIS

Chief Complaint
- Lump in right/left breast
- Pain, redness

O/E: Vitals (pulse, BP, Temp)
Local breast examination

Rx Date: Time:
- **Tab CO-Amoxiclave 625mg (Augmentin, Calamox)** 1+1+1 10day
- **Tab Ibuprofen 400mg (Brufen)** 1+1+1 (for pain)
- **Cap Esomeprazole 20mg (Nexum, Ezomol)** 1+0+1 – 14days

Continue breast feeding

BREAST ENCORGEMENT

Chief complaint:
- Onset: 3rd or 4th day postpartum
- Pain; feeling of heaviness in both breast, Generalized body aches
- Or even transient rise in temp

Painful breast feeding

Rx Date: Time:
Support the breast: with a binder or brassiere
Manual expression: if any remaining milk after each feed
- **Tab paracetamol 500mg (Panadol, Calpol)** 1+1+1

Baby should be put to the breast regularly at frequent interval

CRASH CART DRUGS

(EMERGENCY MEDICATION)

ADRENALINE OR EPINEPHRINE

Adrenaline also called epinephrine is normally produce by both adrenal glands and is a catecholamine & medication!

Action:

- Adrenergic receptor agonist
- Potent β-1 receptor activity and moderate α & β-2 receptors.
- Cardiac output increase both inotropic and chromotropic effects

Indication

1) Anaphylaxis: Emergency tx of allergic reaction (type II), including anaphylaxis, which may result from insect stings or bites, foods, drugs, sera, diagnostic testing substances and other allergens, as well as idiopathic anaphylaxis or exercise induce anaphylaxis.

Adult dose: 0.3 to 0.5mg (0.3 to 0.5ml) IM or SC

Inj. Adrenaline 1mg/1ml

0.3 to 0.5 ml IM in the anterolateral aspect of thigh
upto maximum of 0.5mg (0.5ml) per injection.
Repeat every 5 to 10 mins as necessary.

Children dose: (< 30kg): 0.1 mg/kg (0.01ml/kg) IM or SC

Inj. Adrenaline 1mg/1ml

0.01 mg/kg IM in the anterolateral aspect of the thigh
up to maximum of 0.3mg (0.3ml) per injection
Repeat every 5 to 10 mins as necessary

2) Hypotension Associated with Septic Shock

- Adrenalin is indicated to increase mean arterial blood pressure in patients with hypotension associated with septic shock.
- Dilute 1 mL (1 mg) of epinephrine from its vial to 1,000 mL of a 5% dextrose or 5% dextrose and NS to produce a 1 mcg per mL dilution
- the suggested dosing infusion rate of intravenously administered epinephrine is 0.014 mcg/kg/minute, and is titrated to achieve a desired mean arterial pressure (MAP). The dosage may be adjusted periodically, such as every 10-15 minutes, in increments of 0.05 to 0.2 mcg/kg/min, to achieve the desired blood pressure goal.

3) Cardiac arrest. 1mg (1:1000 dilution) – 1ml IV
The dose should be comparable to the standard IV dose of epinephrine (0.01 mg or ml/kg - 1 mg every 3 to 5 mins).
This is accomplished by
Inj. Adrenaline 1mg in 250ml NS or Dextrose saline IV @ 1ųg/min & increase to 3 to 4 ųg// min better to give through central venous line **OR**

- In cardiac arrest will also give 1: 10,000 Solution every 3 to 5 mins
- How to make 1:10,000

Inj. Adrenaline 1mg (1 ml) mix it with 9 ml NS it will become 1: 10,000 Solution
or give 1 mg (1 md) Adrenaline followed by 10ml NS flush

4) Severe Asthma: As nebulization: 3 to 5ml of adrenaline (1:1000)
Take 0.3 ml of Adrenaline (1:1000) dilute it with 3 to 5ml NS. & Give as nebulization)

5) Bradycardia (Persistence bradycardia or bradycardia not responding to Atropine)

Adverse effects

- Anxiety, apprehensiveness, restlessness, tremors, weakness, dizziness, sweating, palpitation, pallor, nausea, vomiting, headache

Complication: Tachyarrhythmia, hyperglycemia)

Nor-Adrenaline (Norphine)

ACTIONS:

- Acts on α-1 and β-1 receptors
- B-1 action increases heart rate and α-1 action increases MAP and there is reflex Bradycardia and hence in effect heart rate is not much affected
- In non-septic patient it act as renal Vasoconstrictor and in Septic patient it act as renal vasodilator

Indication:

- **Cardiogenic shock** – 0.05 to 0.4 mcg/kg/min
- **Post cardiac arrest** -0.05 to 1mcg/kg/min to a maximum dose of 1 to 3.3mcg/kg/min(5mcg/min to 250mcg/min)
- **Sepsis** -0.025mcg/kg/min to 1mcg/kg/min to a maximum dose of 3.3mcg/kg/min(2 to 250mcg/min)

DOSE: 0.1 to 0.5 mcg Maximum up to 1mcg

Injection: Inj. Norphine 1 ampule= 4mg

Calculation of concentration

Mix 4mg (1amp) in 100ml Normal saline

So 4mg/100ml= 0.04 mg/ml

Now convert to mcg (Multiply by 1000)

So 0.04 × 1000 = 40mcg/ml

Formula:

Dose required × weight × 60 min/drug Concentration

- **If the dose required is 0.1mcg and weight of patient is 60kg**
  0.1 × 60 × 60/40= 9 ml/hour so **Rate of infusion** will be 9ml/hour
- **If the dose required is 0.3 and weight of patient is 60kg**
  0.3 × 60 × 60/40=27 ml/hour so **Rate of infusion** will be 27ml/hour
- **If the dose required is 0.5 mcg and weight of patient is 60kg**
  0.5 × 60 × 60/40= 45ml/hour so **Rate of infusion** will be 45ml/hour

Complications:

- ✓ Local infiltration
- ✓ Tachyarrhythmia

ATROPHINE

Atropine reverses Ach induced bronchospasm, bronchorrhea, bradycardia and hypotension

Atropine competes with acetylcholine at muscarinic receptors, preventing cholinergic activation

Onset of Action	Metabolism	Half-life	IV dose(Adult)	Indication
IM: ≤15-30 min IV: Immediate	Hepatic	Adult: 2 to 4 hour	1mg every 3-5 min (max total dose: 3mg or 0.04mg/kg)	Symptomatic sinus Bradycardia

Uses:

- ❖ Symptomatic Bradycardia (Shock, chest pain, altered sensorium, Cardiac failure)
  - ➢ 1mg stat - repeat every 3-5 min-max up to 3 mg
  - ➢ Children 0.02 mg/kg
  - ➢ IV/IO/ET tube (3 times of normal dose)
  - ➢ Atropine is ineffective in heart tx recipients due to lack of vagal innervation and not effective for type II 2nd degree and 3rd degree heart block
  - ➢ Anti-secretory Agent (0.5-1 mg) - repeat 4 -6 hourly
- ❖ Oragnophosphorus / Carbamates poisoning
  - ➢ 1-2 mg bolus-repeat every 5 min by doubling it - till there is absence of bronchorrhea/bronchospasm Or till atropinization

FEATURES OF ATROPINIZATION:

Mydriasis, Tachycardia, Bronchodilator, Raised temperature, Dry axilla

- ✓ Initial dose 1 mg IV, if no adverse effects give 2 mg every 15 minutes till the patient develops atropinization (drying of secretions, tachycardia, dry mouth, and dilated pupil)
- ✓ Injection(Vial) - 1 mL contains: atropine 1 mg, (Ampule - 1ml = 0.6mg), Atropine also can be used as infusion (The average patient requires approximately 40 mg/d)

MAINTENANCE DOSE OF ATROPINE:

- 10 to 20% of atropinization dose. For example a patient need total 10 ampule of atropine for atropinization. So 1 to 2 ampoule 1 hourly is maintenance dose.
- These can give as IV infusion drip (either normal saline or 5%DNS) OR IV directly.

Example of IV infusion drip- 12 ampule in 1 liter NS IV stat @10 to20 drops/min. (for 24 hour)

- During maintenance phase if creps/wheeze appear in lung stat 1 to 2 ampule atropine IV directly

➢ Continuous infusion - 10-20% of total bolus

❖ **Mushroom poisoning:** 1-2 mg - titrate and repeat

MONITORING DURING MANAGEMENT

Vitals, Spo2%, Investigation - ECG, RBS, serum Electrolyte, Serum Amylase

Adverse reactions:

- ➢ **Cardiovascular:** Atrial & ventricular arrhythmia/fibrillation/AV dissociation/flushing/tachycardia/ ECG changes **CNS:** agitation, amnesia,anxiety,ataxia,confusion, coma
- ➢ **Dermatologic:** Anhidrosis, dry skin, rashes, **Gastrointestinal:** constipation, vomiting
- ➢ **Metabolic:** Dehydration, hyper/hypoglycemia, hypokalemia & Hyponatremia, increased thirst
- ➢ **Genitourinary:** Urinary retention, **Myasthenia Gravis**- Myasthenic crisis
- ➢ Chronic lung disease – plug formation, Glaucoma-precipitate acute glaucoma
- ➢ CKD-renal impairment, Blood-leukocytosis, decreased/increased Hb, abnormal erythrocytes
- ➢ Muscle- twitching, weakness, Ophthalmic- abnormal eye movements, blindness
- ➢ Resp-changes in respiration, Hypersensitivity

Dopamine

Dopamine is an endogenous catecholamine and a metabolic precursór of norepinephrine and epinephrine that acts on dopamine, alpha and beta receptors.
Dopamine increases cardiac output, blood pressure, and peripheral perfusion

Mode of Action:

It has dose dependent actions.

- At intermediate doses (5 to 10 mcg/kg/min = Cardiac dose), dopamine increases renal blood flow, heart rate, cardiac contractility, and cardiac output.
- At high doses (>10 mcg/kg/min= alpha 1), the a-adrenergic effects of dopamine dominate, leading to vasoconstriction and increased blood pressure.
- Low- dose (1 to 5 mcg/kg/min = Renal dose) dopamine is no longer recommended for renal protection due to lack of patient outcome evidence.

Indication:

- Dopamine is indicated for reversing hemodynamically significant hypotension caused by myocardial infarction, trauma, heart failure, and renal failure, when fluid resuscitation is unsuccessful or inappropriate.
- Ideal in hypotension with Bradycardia
- Used as a second line inotrope after noradrenaline
- Dopamine is also used as an infusion in symptomatic Bradycardia not responding to atropine (5-20mcg/kg/min)

Drug dilution and formula

1 ampule= 200mg

Step 1

Calculation of concentration
Mix 200mg in 100ml Normal saline So 200mg/100ml = 2mg/ml
Now convert to mcg (Multiply by 1000)
So 2 × 1000=2000mcg/ml

Formula

Dose required × weight × 60 min/drug Concentration

- **If the dose required is 3mcg/kg/min** and **weight of patient is 60kg**
  3 × 60 × 60/2000 = 5.4ml/hour so **Rate of infusion** will be 5.4ml/hour
- **If the dose required is 5mcg/kg/min** and **weight of patient is 60kg**
  5 × 60 × 60/2000 =10.8ml/hour so **Rate of infusion** will be 10.8ml/hour
- **If the dose required is 10mcg/kg/min** and **weight of patient is 60kg**
  10 × 60 × 60/2000 = 18ml/hour so **Rate of infusion** will be 18ml/hour
- If the dose required is 15mcg/kg/min ie vasoconstriction dose and weight of patient is 60kg
  15 × 60 × 60/2000 = 27ml/hour so **Rate of infusion** will be 27ml/hour

Adverse effects:

- Chest pain, Ectopic beats, palpitations • nausea, vomiting, Headache, tissue ischemia, tachycardia. hypotension (low doses) hypertension (high doses)

DOBUTAMINE

- It is a synthetic dopamine analogue
- Potent inotropic and mild vasodilatory & chromotropic effects
- Competitively bins with α and β-receptors (β1 > β2 > α1)
- So it increase Contractility and heart rate with neutral effect or possible decrease in BP

Pharmacokinetics:

Metabolism	Excretion	Half life	Onset of action, Peak effect
In tissues and hepatically to inactive metabolites	Urine (as metabolites)	2 min	Onset: 1-10 min Peak: 10-20 min

INDICATION:

- **Cardiogenic shock** (increase Stroke volume, Heart rate, Decrease SVR- increase Cardiac output)
- **Persistence hypotension** despite adequate fluid resuscitation & the use of vasopressor agents (Sepsis)
- **Late stage Heart Failure**

NOTE: Dobutamine Usually works in Hypotension up to 80 to 90mmHg. And not helpful or good option in severe hypotension

Dose: 2.5 mcg/kg/min to 20 mcg /kg/min
Max up to 40mcg/kg/min can be given in adult
Inj. Dobutamine 1 ampule = 250mg

Drug dilution and Formula:

Step 1:

Mix 250mg (1 ampule) in 100ml NS so will become 2.5mg/ml
Now to convert mg to mcg we will multiply it with 1000 like
2.5mg/ml X 1000 = 2500mcg/ml

Formula: Dose required × weight × 60 min/drug Concentration

- **If the dose required is 2.5mcg/kg/min & weight of patient is 60kg then**
  2.5 × 60 × 60/2500 = 3.6 ml/hour so **Rate of infusion** will be 3.6ml/hour
- **If the dose required is 5mcg/kg/min and weight of patient is 60kg then**
  5 × 60 × 60/2500 = 7.2 ml/hour so **Rate of infusion** will be 7.2ml/hour
- **If the dose required is 10mcg/kg/min and weight of patient is 60kg**
  10×60×60/2500= 15ml/hour so **Rate of infusion** will be 15ml/hour
- **If the dose required is 20mcg/kg/min and weight of patient is 60kg**
  20×60×60/2500 = 29ml/hour so **Rate of infusion** will be 29ml/hour

Side effects: Increases Heart rate and BP, Nausea & Vomiting, Palpitation, Ectopics, Shortness of breath

Adverse Effects: Asthma Attack, Ventricular Ectopics, Hypotension, Anaphylaxis

Sympathomimetic agents:

DRUG	RECEPTOR TYPE				ACTIONS			
	a	B1	B2	Dopamine	Cardiac stimulation	Vaso Constriction	Vaso dilation	Cardiac output
Dobutamine	+	++++	++	0	++++	+	++	↑
Dopamine	++	++++	++	++++	5-10 mcg	> 10mcg	0.5-5mcg	↑
Epinephrine	+++	++++	+++	0	++++	++++	++	↑
Norepinephrine	++++	++++	0	0	++	++++	0	Nil
Phenylephrine	+++	0	0	0	0	++++	0	↓

	DOPAMINE	DOBUTAINE
Mechanism	Adrenergic +, Dopaminergic: DA 2, α, β	Pure Adrenergic: B-1 > β-2 > α
Effect on BP	Increased, Sustained	Increase/neutral/decrease
Effect on renal blood flow, and diuresis	Improves at low dose by direction action	No direct action/may improve due to cardiac function
Arrhythmogenicity	More (less than dobutamine)	More (Generally safe)
Inotropic action	Less	More, Consistent
Clinical utility		
Renal Failure	YES	NO
Shock	YES	NO
Cardiac Failure	NO	YES
Ischemic LVF	NO	YES

MAGNESIUM SULPHATE (MgSO4)

MgSO4 is a Na K ATPase pump cofactor
Action: Delayed after depolarization And Vasodilation

Onset	Half life	Excretion	Distribution
IV: Immediate IM: 1 hour	4 hours	Urine, stool	Bone(60%), extracellular fluid 2%

Rx Only NDC 51754-1010-1
Magnesium Sulfate Injection, USP
50% (5 grams/10 mL)
For IM or IV Use
Must be Diluted before IV Use
10 mL Single Dose Vial

USES:

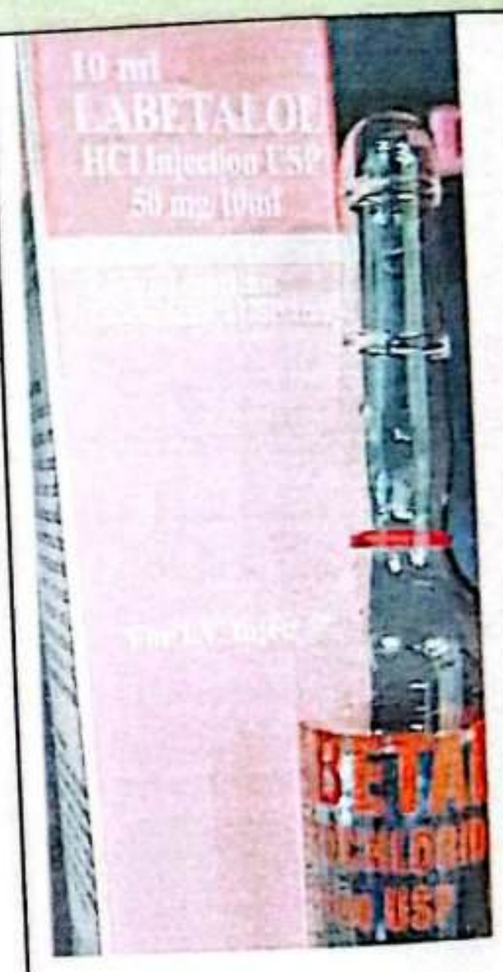
- COPD, Bronchial Asthma acute exacerbation
- Pre eclampsia/Eclampsia
  IV – 4-6 gm over 15 min at onset of labour ---1-2 g/hr x 24 hr
  IM- 5 gm each buttock ---5 gm every 4 hr for 24 hrs
- Fetal neuroprotection for imminent preterm birth
  4 gm In 30 min 1 g/hr continuous infusion
- Hypomagnesemia, Torsade de pointes
- 1-2gm iv in migraine headache as adjuants therapy

Adverse reaction: Flushing, Hypotension, Vasodilatation, Hypermagnesemia,
Contraindications: Hypersensitivity, Heart block

Labetalol

Introduction:

- Antihypertensive drug
- Beta blocker(β1 - heart rate & force of contraction, β2 - Vasoconstriction)
- Alpha blocker (Alpha 1 - Vasodilator)
- Oral tablet (100-300 mg), IV –Inj. Labetalol 50mg/10ml (5 mg/ml)



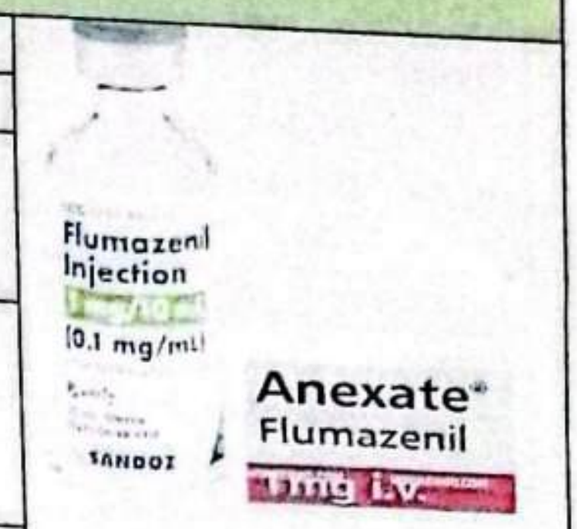
USES:

- Acute aortic Syndrome/dissection (SBP < 120 mmHg & HR < 60/min)
- Intermittent 20 mg over 2 min followed by 20-80 mg every 10 min
  Continuous IV -0.5 to 2 mg/min
- Acute ischemic stroke (BP < 185/110 mmHg)
- Prior to reperfusion therapy - 10 to 20 mg over 2 min
- After reperfusion therapy - 10 mg over 2 min ---2 to 8 mg/min
- Acute severe HTN: Intermittent 5 - 20 mg IV bolus
- Chronic/Resistant HTN: Oral 100 mg twice daily - titrate- 200 to 800 mg/day
- Hypertensive Emergency: Intermittent bolus 10-20 ---80 mg
  Continuous- 10 bolus - 0.5 to 2 mg/min (up to 10)
- HTN emergency in pregnancy/postpartum Intermittent IV --Continuous IV, Oral
- ICH/SAH: Intermittent IV - continuous IV

Inj. Labetalol 50mg/10ml (5mg=1ml) 20mg(4ml) IV over 2 minute repeat after 15-20 minute if needed
40mg (8ml) in 100 ml NS or Pladyx IV slowly over 20 minutes
Maximum IV DOSE: 300mg (60ml) in 24 hours
Maximum Oral dose: 2500mg PO IN 24 hours

SIDE EFFECTS: Fatigue, Dizziness, Orthostatic hypotension, Flushing, Nausea, Drowsiness, Anaphylactic reactions Floppy Iris syndrome, Hepatic Injury, Hypotension/syncope

FLUMAZENIL



Injection: Inj. Flumazenil (Anexate) 0.5mg/5ml, 1mg/10ml

INDICATION: Benzodiazepine overdose

DOSE:
0.01 mg/kg IV (0.2mg over 15seconds) repeat every 1 minute to maximum 4 doses.
0.02 In case of resedation repeat the doses after 20mts to a maximum of 3mg in 1hr

CONTRAINDICATION:
Associated Tricyclic antidepressant overdose, Overdose of unknown agents, physical dependence on benzodiazepines, Co-ingestion of seizure-inducing agents, Known seizure disorder, Suspected increased ICP (intracranial pressure)

ADVERSE EFFECTS: Seizures, anxiety, insomnia, pain at injection site, palpitations

SPECIAL PRECAUTIONS- Re-Sedation, avoid in head injury, hepatic impairment.

Sodium Bicarbonate

INDICATION:

1) **Salicylate Poisoning**
2) **Barbiturates Poisoning**
   Dose: 1mEq/kg IV bolus, followed by an IV drip of 100ml of 5% dextrose saline to which 2-3 ampule of sodium bicarbonate are added, initiate 200mL/hour, titrate drip rate to blood PH (7.45) and urinary PH (7.5-8)
3) **Metabolic acidosis (low PH)** , Dose: find deficit (according to deficit) like
   All the doses are written in millimoles of Sodium bicarbonate. Determine by Base deficit full correction dose (mmol) = 0.3 x base deficit (mmol/L) x weight (kg). so administer half of the calculated dose and then access the need for reminder. Be sure to dilute the IV preparation prior to administration

In non-life-threatening metabolic acidosis the Dose is: 2-5 mEq/kg IV infusion over 4-8 hour depending on the severity of acidosis

In Severe metabolic acidosis (except Hypercarbic acidosis) the Dose is: 90-180mEq/L (7.5-15g) at rate of 1-1.5 L(first hour); adjust for further management as needed

CONTRAINDICATION: Nontoxic ingestion, Unprotected airway, Corrosive ingestion, Possibility of upper gastrointestinal perforation

ADVERSE EFFECTS: Vomiting, constipation, fecal discoloration, Aspiration of the activated charcoal, Impaired absorption of orally administered antidotes

SPECIAL PRECAUTIONS: Give via RT or with fruit juice, risk of vomiting and Decreases peristalsis, hence secure the airway in patients with low GCS.

NALOXONE

INJECTION: Inj. Naloxone 4mg/10ml (0.4mg/ml)

INDICATION: Opioids, Clonidine toxicity

DOSE: 0.1-0.4 mg IV, 0.4-0.8mg IM, 0.8 mg sub Q, 4-8mg IN

CONTRAINDICATION: Hypersensitivity to naloxone

ADVERSE EFFECTS: VT, VF, hypotension, hypertension, tachycardia, abdomen pain, agitation, confusion, coma, pain at injection site

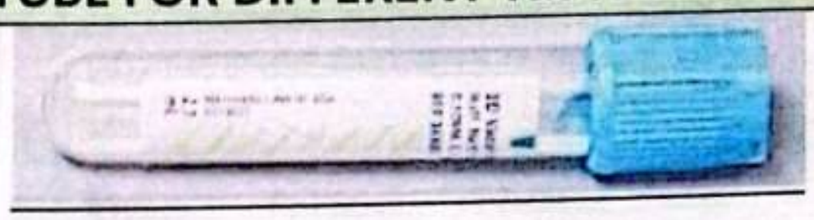
SPECIAL PRECAUTIONS: Patients might have symptoms secondary to opioid withdrawal, CAD patients might develop hypotension, pulmonary edema, arrhythmia

DIFFERNET TESTS TUBE FOR DIFFERENT TESTES

CITRATE TUBE (Blue top)

Uses

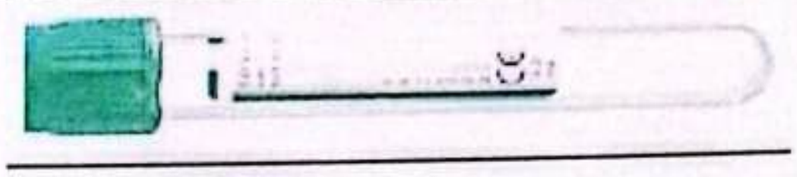
- PT/INR, APTT
- D-DIMERS
- FDPs



HEPARIN TUBE (Green top)

Uses:

- RFTs, Serum electrolyte, Serum LDH
- Toxicology, serum albumin, serum calcium
- Serum Phosphorus, serum magnesium
- CRP, RA factor, DENGE NS1,
- Serum uric acid, Blood glucose
- Serum amylase, serum lipase
- Direct/indirect Bilirubin, Hep A antibodies
- HBSAG, Anti-HIV, Anti HCV
- Indirect comb test, osmotic fragility test

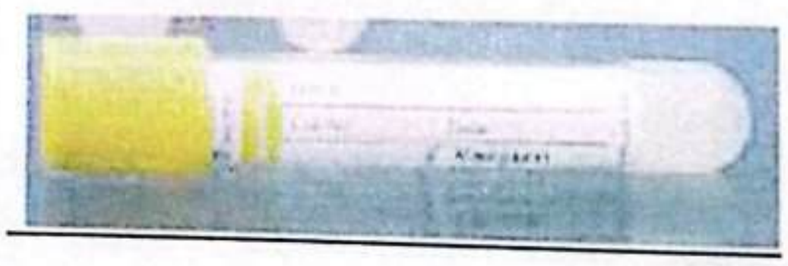


EDTA TUBE (Purple top)

USES:

- CBC (or FBC), Retic count, ESR
- Blood smear, Direct comb test
- Malaria parasite, G6PD
- HBA1C, HB electrophoresis
- Blood grouping, Cross match
- Red cell folate level, MONOSPOT test

GEL TUBE (Yellow top):

Uses;

- Cardiac markers
- Ferritin, TFTs, Serum cortisol
- Antibodies ANA, HCV PCR
- Alpha Feto protein
- CEA, CA125, PSA, CA19
- Vit-D, Serum Osmolality